

SERVICE MARKET ANALYSIS AND FORECAST  
SMALL SYSTEMS

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## **SERVICE MARKET ANALYSIS AND FORECAST SMALL SYSTEMS**

### **ABSTRACT**

Small systems service will continue its pattern of moderate growth (15% average annual growth rate) through 1990, growing from a \$2.3 billion revenue base in 1985 to \$4.7 billion in 1990. Revenue in this service market sector will come under increasing pressure from numerous fronts, requiring vendors to implement new business strategies if they are to realize the revenue and profit potentials.

Growth of hardware shipments, a traditional source of service revenue growth, will not only slow, but will also change as the traditional 16-bit systems lose ground to new products at both the low and high ends of the small systems range and as microcomputer and mainframe manufacturers encroach on the overall small systems market.

This report analyzes the market for maintenance and service on small systems (traditional 16-bit minicomputers to 32-bit superminicomputers) in the U.S. from 1985-1990. The report focuses on identifying trends in service, explaining critical issues to be addressed by vendors, and making recommendations to help vendors adapt to changing conditions. Some of the major topics discussed in this report include: forecast of the small systems service market, the growing user requirements, the importance of non-hardware services, and dealing with high user expectations.

This report contains 116 pages, including 41 exhibits.





# SERVICE MARKET ANALYSIS AND FORECAST

## SMALL SYSTEMS

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## I INTRODUCTION



## I INTRODUCTION

- The small systems service market is growing at only a moderate rate as a result of a decline in product shipments, an increase in user requirements on top of a current level of dissatisfaction, and an increase in both the number and kinds of competitive practices. Like vendors in other service market sectors, small systems vendors are only now adapting their service delivery strategies to changes in the service marketplace. Vendors are finding that they must change the structure of their service business as the market rapidly changes if they are to remain competitive.
- The purpose of this report is to identify trends in the small systems service market, to explain how these trends will affect the overall market, and to suggest strategies that may help INPUT's clients take advantage of the opportunities that are likely to unfold as the market changes.
- This volume is divided into five sections:
  - The Executive Summary presents a brief overview of the most prominent findings and recommendations of the report.
  - The Small Systems Service Market Analysis provides a financially-oriented overview of the small systems, third-party maintenance (TPM), and total service market for the forecast period 1985-1990.

- The Impact of User Service Requirements section reviews users' views of current service levels and likely changes in service requirements.
  - Small Systems Service and Support Issues discusses the specific trends affecting hardware and software maintenance, professional services, educational services, and pricing of services.
  - Conclusions and Strategic Recommendations presents strategic alternatives that may help vendors exploit both the issues and opportunities that are a part of the marketplace.
- The information in this report was based on interviews with and comments from 372 small systems users, managers, and planners as well as extensive interviews with over 50 service vendors in the United States. (See Appendices A and B for the questionnaires used during these interviews.)
    - Exhibit I-1 summarizes the user interview sample by type of installed hardware and distinguishes those systems used in the traditional minicomputer analyses (16-bit, multi-user, and business/scientific systems) from those considered in the superminicomputer analyses.
  - In addition to primary research, numerous secondary sources were used for background information. These sources included annual reports, 10K reports, articles from professional journals and the trade press, and previous reports included in INPUT's Customer Service Program (CSP). The reader may wish to refer to these latter reports, specifically:
    - User Service Requirements--Small Systems.
    - Service Market Analysis and Forecast--Large Systems.
    - Service Market Analysis and Forecast--Telecommunications.

## EXHIBIT I-1

## SMALL SYSTEMS INTERVIEW SAMPLE BY PRODUCT

Total Interviews: 372			
Burroughs		Honeywell	
B19XX	26	DPS/6	<u>20</u>
B9XX	4	Total	20
B9X	<u>2</u>		
Total	32	IBM	
		Series 1	20
Datapoint		System 36	20
86XX	13	System 38	<u>24</u>
88XX	<u>4</u>	Total	64
Total	17		
		NCR	
DEC		9100	20
VAX 11/750, 780	29	9300	<u>21</u>
PDP11/70	<u>20</u>	Total	41
Total	49		
		Perkin-Elmer	
Data General		32XX	<u>18</u>
MV Series	20	Total	18
Nova	11		
Eclipse	<u>14</u>	Prime	
Total	45	750	4
		850	7
Four-Phase		2250	7
IV/40 - IV/90	<u>21</u>	9950	<u>2</u>
Total	21	Total	20
Hewlett-Packard		Other	20
3000	<u>25</u>		
Total	25		





## II EXECUTIVE SUMMARY

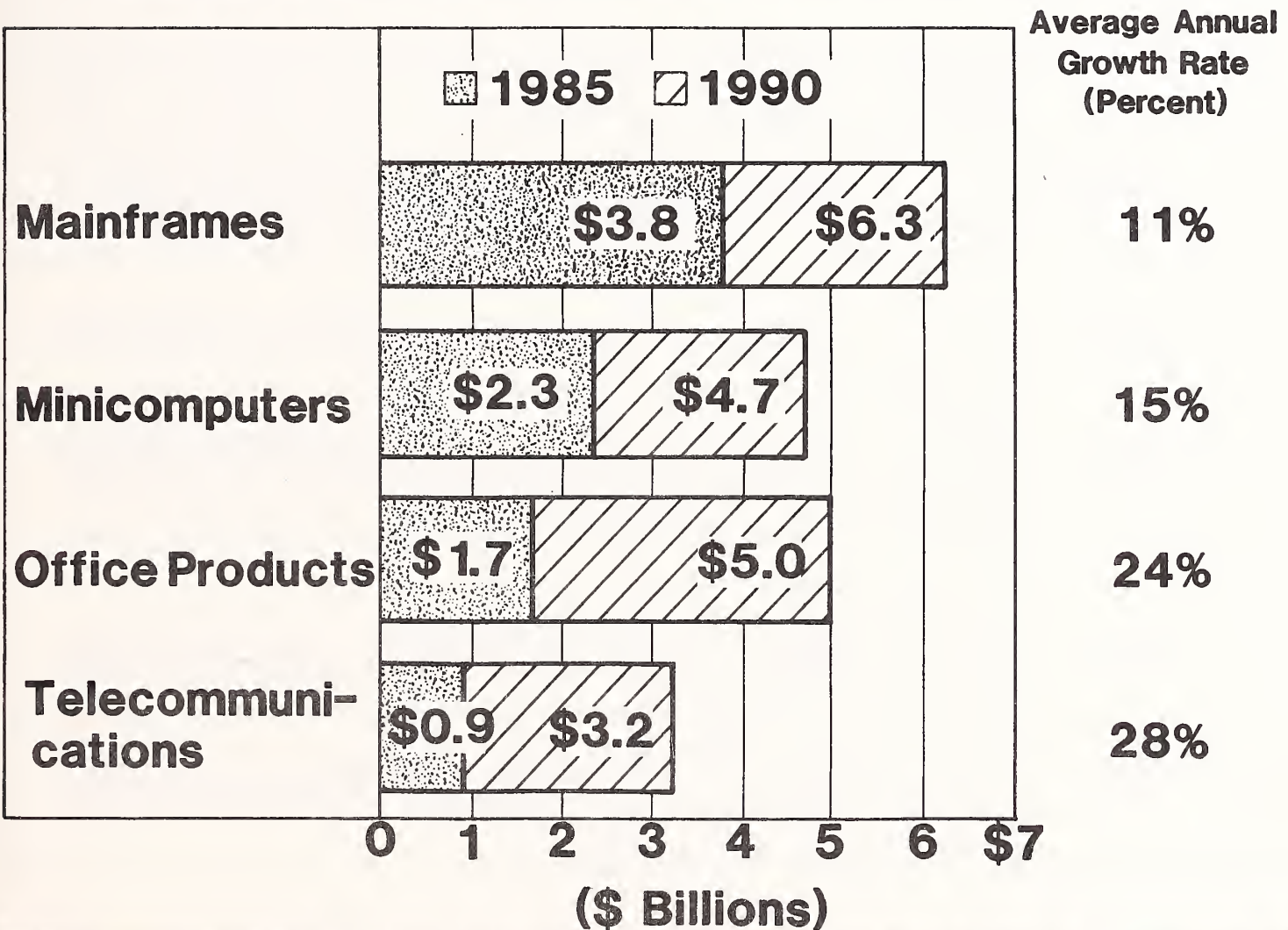


## II EXECUTIVE SUMMARY

- This Executive Summary is organized in a presentation format to provide the busy reader with a quick and orderly review of the key research findings and strategic recommendations of this report. Main points are summarized in exhibits on the right-hand pages and accompanied by text on the facing page that highlights that exhibit. The format is designed to facilitate use of the executive summary as an in-house overhead presentation.
- The goal of this study is to track trends impacting the market and then identify the long-term strategic directions that vendors may wish to employ to further exploit the revenue and profit potential that will result from this dynamic market.
- The small systems service market is changing dramatically. First, rapidly increasing rapid introductions of more powerful products that include the latest advances in service technology have improved uptime and serviceability while lowering service costs to the manufacturer. Second, small systems vendors are penetrating nontraditional markets such as office automation. This has expanded the growth of these vendors, but has also led to higher demands for service by users.

#### A. SERVICE REVENUE FORECASTS, 1985-1990

- Small systems service revenue will increase from its current \$2.3 billion size to \$4.7 billion in 1990. However, its moderate 15% average annual growth rate (AAGR) will result in a decline in overall service market share from 18% in 1985 to 16% in 1990. Other market share changes anticipated by 1990 include office products (+4% increase in share), telecommunications (+4%), personal computers (+2%), terminals (+1%), peripherals (-2%), and mainframe computers (-7%).
- A major cause of the slowdown in the growth rate of small systems service is the intense competition for equipment sales in this market. Minicomputer manufacturers are being squeezed at the low end of the sector by powerful and inexpensive personal computers and at the top end by economical mainframes (i.e., IBM 4300). While small systems manufacturers have now responded with new low-end systems and, at the high end, very powerful 32-bit superminicomputers, service on these systems has not yet replaced the service revenue share of the traditional 16-bit machines. Through the forecast period service revenue from the latter category will remain stable as a mature business while service revenue from both low- and high-end systems will grow rapidly.
- Small systems service vendors are also confronted with the fact that technical improvements make systems more reliable. These advances improve equipment serviceability and decrease the cost of service, providing the user with an additional amount of uptime that lessens the perceived value of service and fosters expectations for still lower service prices. Increased competition, in turn, contains prices and requires vendors to seek new or repackaged service options to maintain revenue.

INPUT<sup>®</sup>**SERVICE REVENUE FORECASTS, 1985-1990**



## B. THE CHANGING MIX OF SMALL SYSTEMS SERVICE

- The mix of small systems service will change during the forecast period with hardware maintenance holding a sizable but steadily declining share while nonbasic services (software support, consulting, training, etc.) advance.
  - Hardware maintenance, while representing the major revenue-generator through 1990, will increase at the slowest rate (12% AAGR). The slower rate will be the result of advances in technology that push the hardware reliability rate nearer the 100% level and, at the same time, urge users to become more service price conscious.
  - Software maintenance and support (25% AAGR) will represent an increasingly important source of revenue. Services will be particularly important in user environments where the integration of hardware, software, and telecommunications makes the components almost transparent to the functional capabilities of the system.
  - An equally rapid rate (23% AAGR) will occur in professional services (planning, consulting, documentation, systems integration, facilities management), although these services represent a much smaller revenue base with a 7% share. Increasing complexity in the market, especially in integrated environments, has resulted in a growing demand for these types of services.
  - Educational services, at \$23 million in revenue in 1985, will grow to \$190 million in 1990, a 52% AAGR. Educational services, like professional services, are important for their secondary benefits--increasing user demand for capability which, in turn, leads to more usage and, eventually, additional service needs and increased customer satisfaction levels.



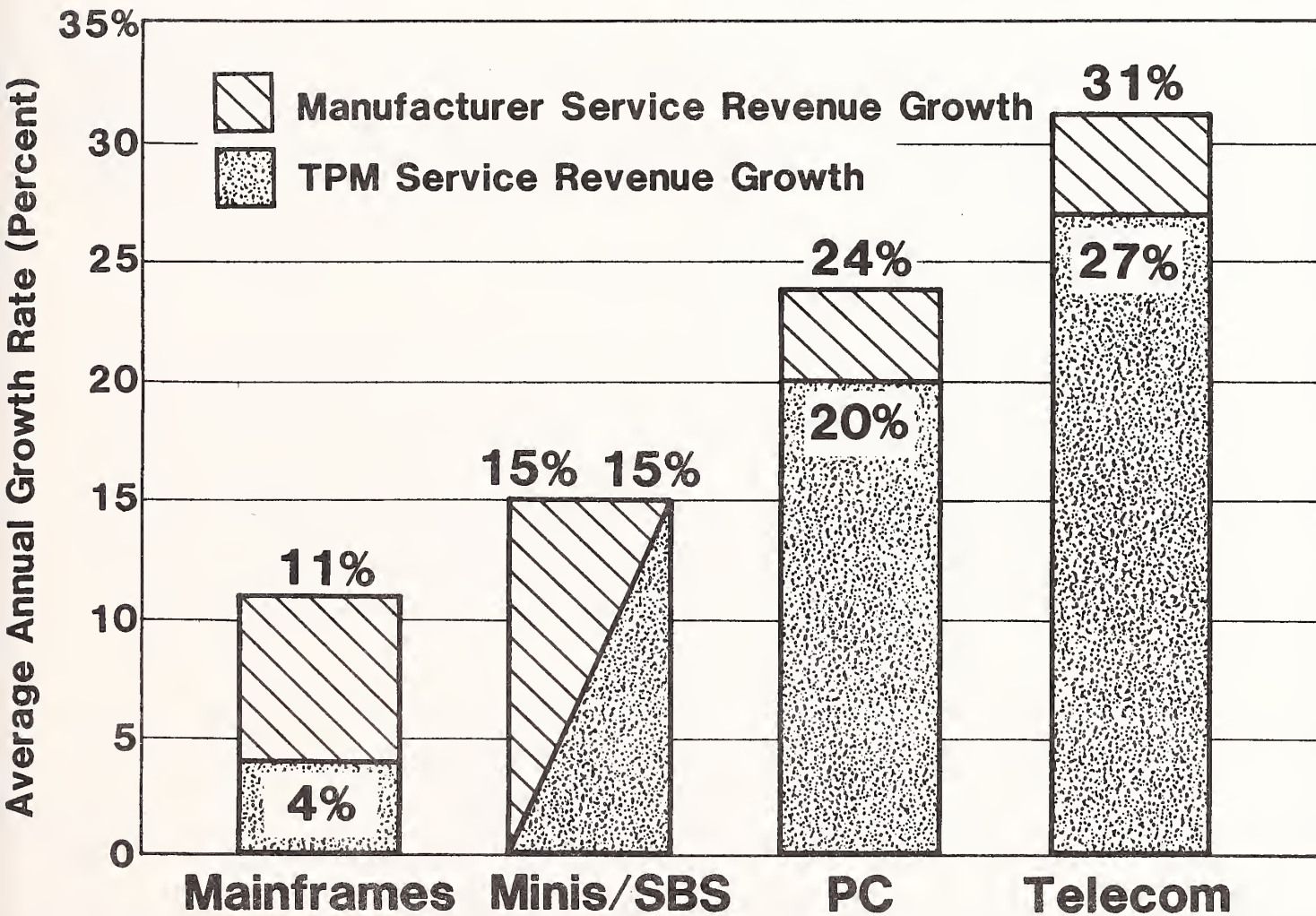
**THE CHANGING MIX OF SMALL SYSTEMS SERVICE**

<b>Service Component</b>	<b>Year</b>	
	<b>1985</b>	<b>1990</b>
<b>Hardware Maintenance</b>	<b>82%</b>	<b>71%</b>
<b>Software Maintenance and Support</b>	<b>12%</b>	<b>18%</b>
<b>Professional Services</b>	<b>5%</b>	<b>7%</b>
<b>Educational Services</b>	<b>1%</b>	<b>4%</b>

### C. SMALL SYSTEMS SERVICE REVENUE GROWTH BY TYPE OF VENDOR

- With small systems shipments growing at a 9.5% AAGR through the forecast period, the expansion rate of the small systems product base is among the slowest of the service sectors. With only low-end and high-end product shipments growing rapidly, service vendors, particularly those focused on the more mature and stable 16-bit segment, will become more aggressive in securing service business by controlling existing accounts, capturing new accounts, and offering a variety of new and repackaged services.
  - At the low end of the small systems market, equipment vendors are very competitive on equipment and service price as a means of thwarting microcomputer penetration in the small systems market.
  - Mid-range 16-bit minicomputers represent an older, larger, and more dense installed base whose users are particularly price conscious. It is in this segment that third-party maintenance (TPM) vendors are particularly successful in using their chief weapon (price) to advantage.
  - Competition in the high-end segment is less intense as the installed base of superminicomputers is relatively small and since users are reluctant to place the responsibility of maintenance on these more complex machines in the hands of anyone besides the manufacturer.
- Small systems manufacturers and TPM vendors will grow at the same rate, 15% AAGR, nearly mirroring the respective rates by type of vendor for the overall market.

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**U.S. SERVICE REVENUE GROWTH, 1985-1990**

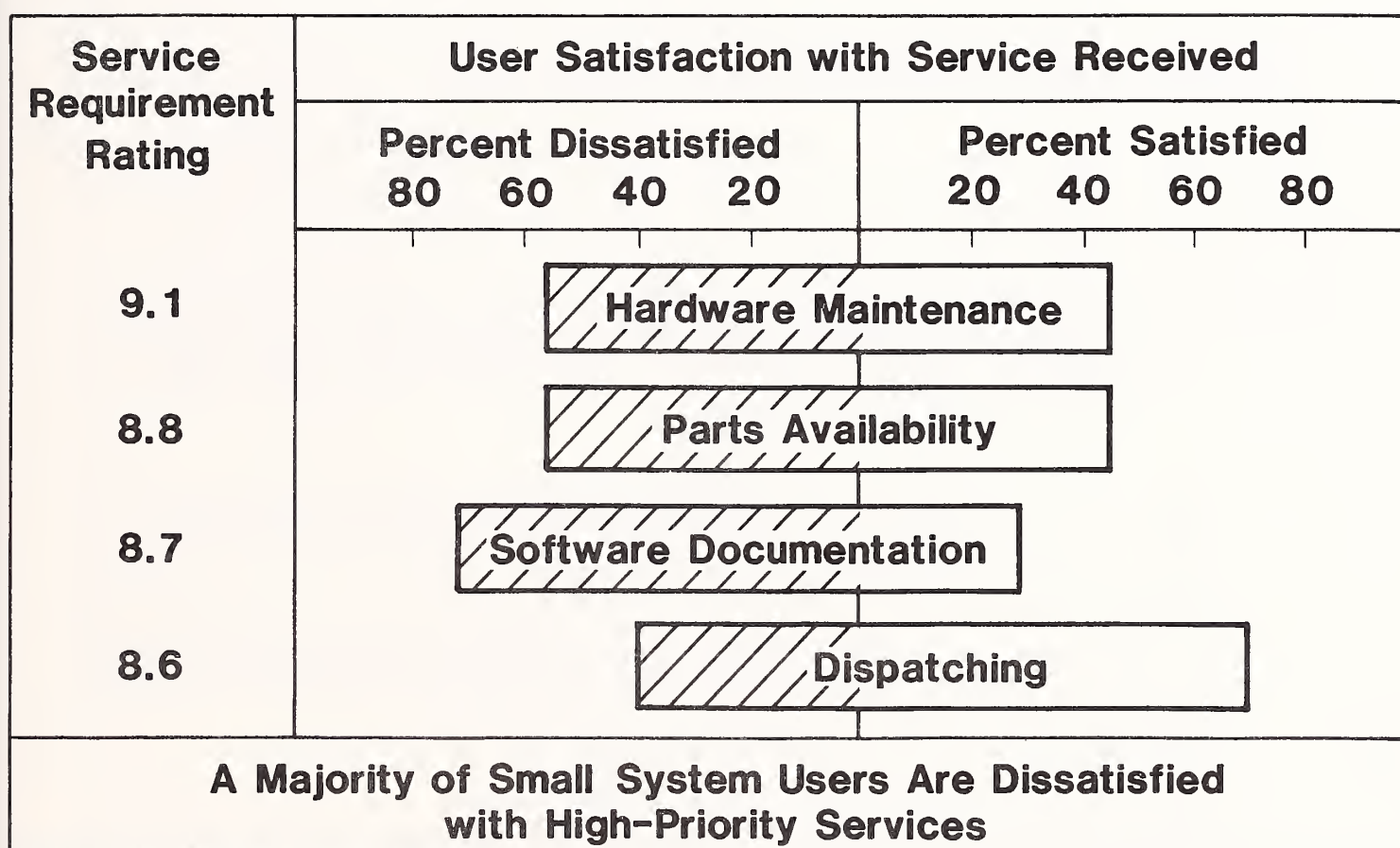


#### D. USER SATISFACTION WITH SERVICE

- Overall user satisfaction with service is typically based on a number of specific services which vary by vendor product and user group. There are, however, a number of high-priority services which consistently show up when users are evaluating vendor performance. Exhibit II-4 lists the top services based on user requirements.
- Vendor performance for high-requirement services such as engineering skill level and overall hardware maintenance typically does not measure up to user expectations for service, resulting in a high level of user dissatisfaction. Vendors have made improvements, but gains have been outstripped by increasing user expectations for service.
  - User satisfaction with software support is declining rapidly as user expectations have increased substantially over the past several years. Less than one-third of all small systems users are satisfied with software documentation, and a majority of users are dissatisfied with all software services except consulting. The rate of dissatisfaction will accelerate unless vendors can keep up with increasing expectations.
  - On the other hand, small systems vendors are "overachieving" in low-priority services where users rate their own requirements for these services at 20-30% lower in importance than the high-priority services. Users are quite satisfied with the support they are receiving in these low-priority areas, with over 60% of small systems users reporting satisfaction with such services as planning, consulting, and training.

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## SMALL SYSTEMS USER REQUIREMENTS FOR SERVICES ARE NOT SATISFIED



Rating: 1 - Low, 10 - High

## E. TRENDS IN SMALL SYSTEMS SERVICE

- The major trend in the small systems service market is the growing differentiation of vendor strategies among the low, middle, and high ends of the market. This differentiation is primarily the result of varying amounts of competition.
  - The low end is very competitive between TPM vendors and small systems manufacturers.
  - The mid-size systems are relatively mature and stable, and the competition is not so much for hardware sales as it is for service.
  - The high end of the market is a relatively new segment being contested between superminicomputer manufacturers and manufacturers of smaller economical mainframes.
- While shipment growth of low-end small systems is expected to continue, the higher level of competition is forcing service vendors to be competitively priced, or even offer service as a hardware sale inducement. A growing level of user dissatisfaction with the quality of this type of service can only foster increased competition and downward pressure on service pricing.
- Nearly the same trend will prevail in the mid-sized arena. TPM vendors will be most active in this segment, offering unbundled services at discount prices. Manufacturers, on the other hand, will continue to seek account control by offering full service and emphasizing software support and professional services that users may not be able to secure elsewhere.
- The high end segment is currently dominated by manufacturers. However, as the installed base grows, it is likely that TPM competition will impact this domination.

## **TRENDS IN SMALL SYSTEMS SERVICE**

- **Growing Differentiation Among Low, Middle, and High Ends of Market**
  - **Higher Levels of User Dissatisfaction Caused By the Growth of Service Expectations**
  - **Increasing Competition**
  - **Increasing Price Sensitivity**
-





### III SMALL SYSTEMS SERVICE MARKET ANALYSIS



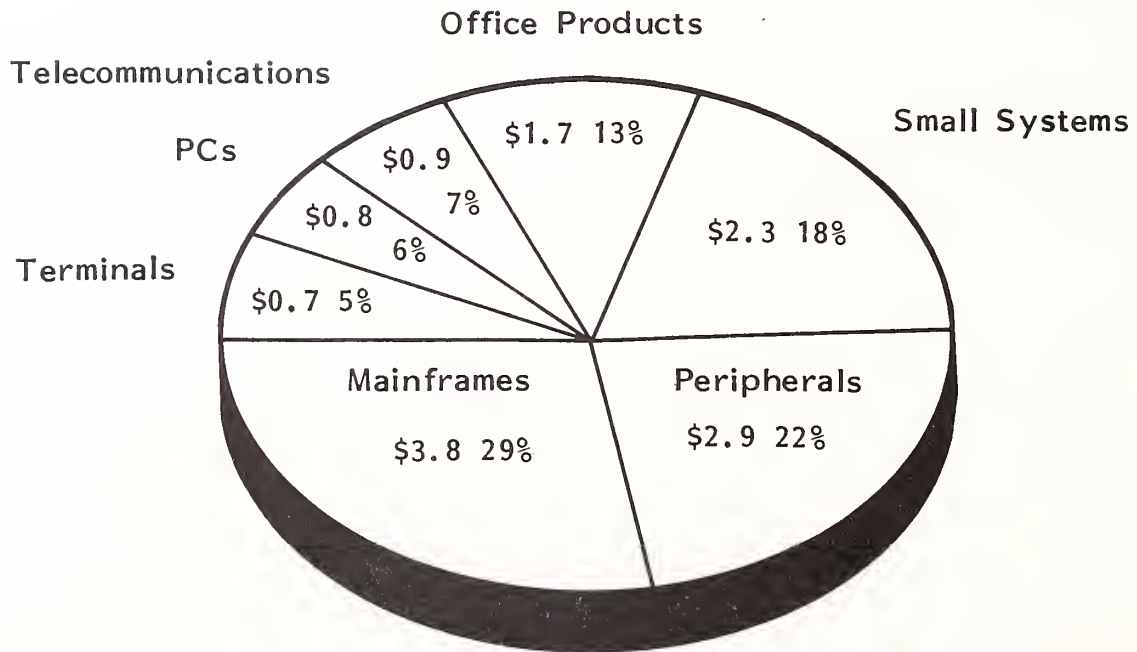
### III SMALL SYSTEMS SERVICE MARKET ANALYSIS

#### A. TOTAL SERVICE MARKET REVENUE, 1985-1990

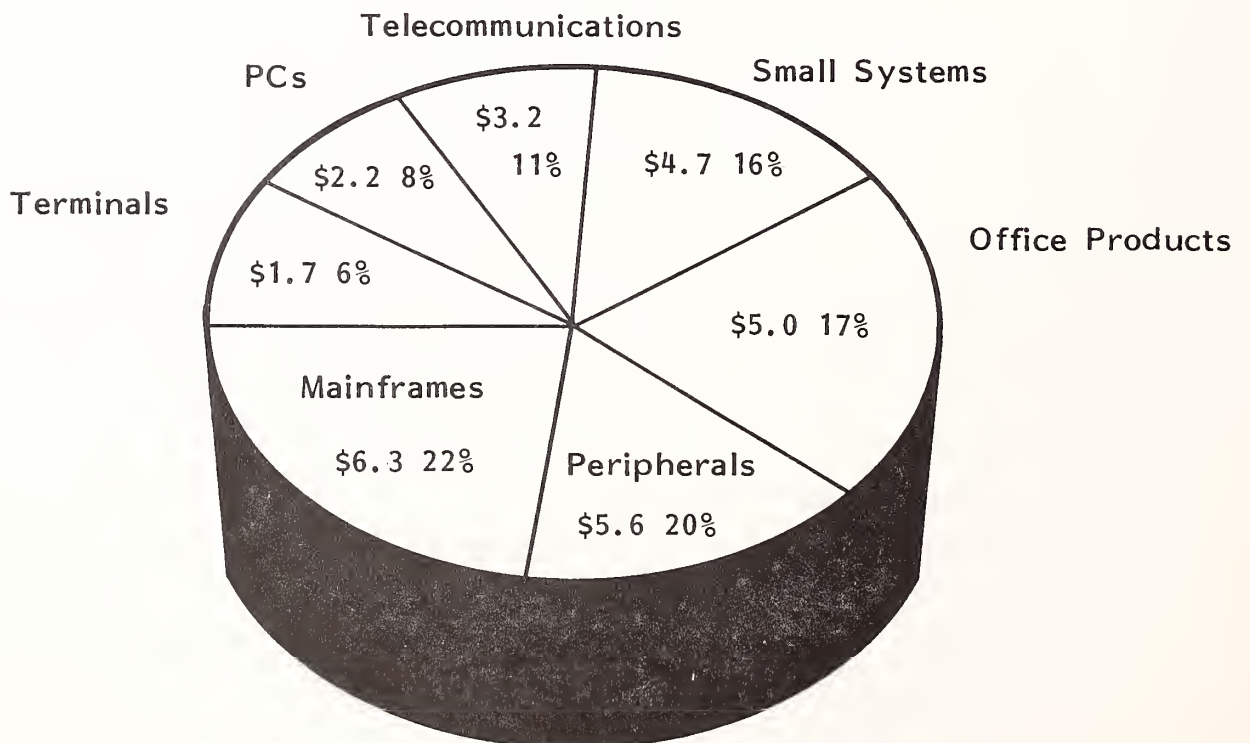
- U.S. computer service market revenue totaled \$13.2 billion in 1985 and is expected to grow to \$28.7 billion in 1990, an average annual growth rate (AAGR) of 17%.
- While the dependence of service vendors on equipment sales is well established, vendors are identifying new sources of service revenue (consulting, planning, site management, sale of supplies, service guarantees, etc.) to offset the moderation in shipments growth to 12% AAGR through the remainder of the decade.
- Exhibit III-1 depicts the revenue earned by each service sector in 1985 and expected for 1990 and the results of the realignment of market share that will occur during the forecast period.
- As competitive pressures restrict service price escalation in the mainframe and small systems markets, other market sectors (most notably PCs, office products, and telecommunications) will increase in total share.
- Exhibit III-2 summarizes the revenue picture by service sector and adds INPUT's average annual growth rate forecast.

EXHIBIT III-1

U.S. CUSTOMER SERVICE REVENUE



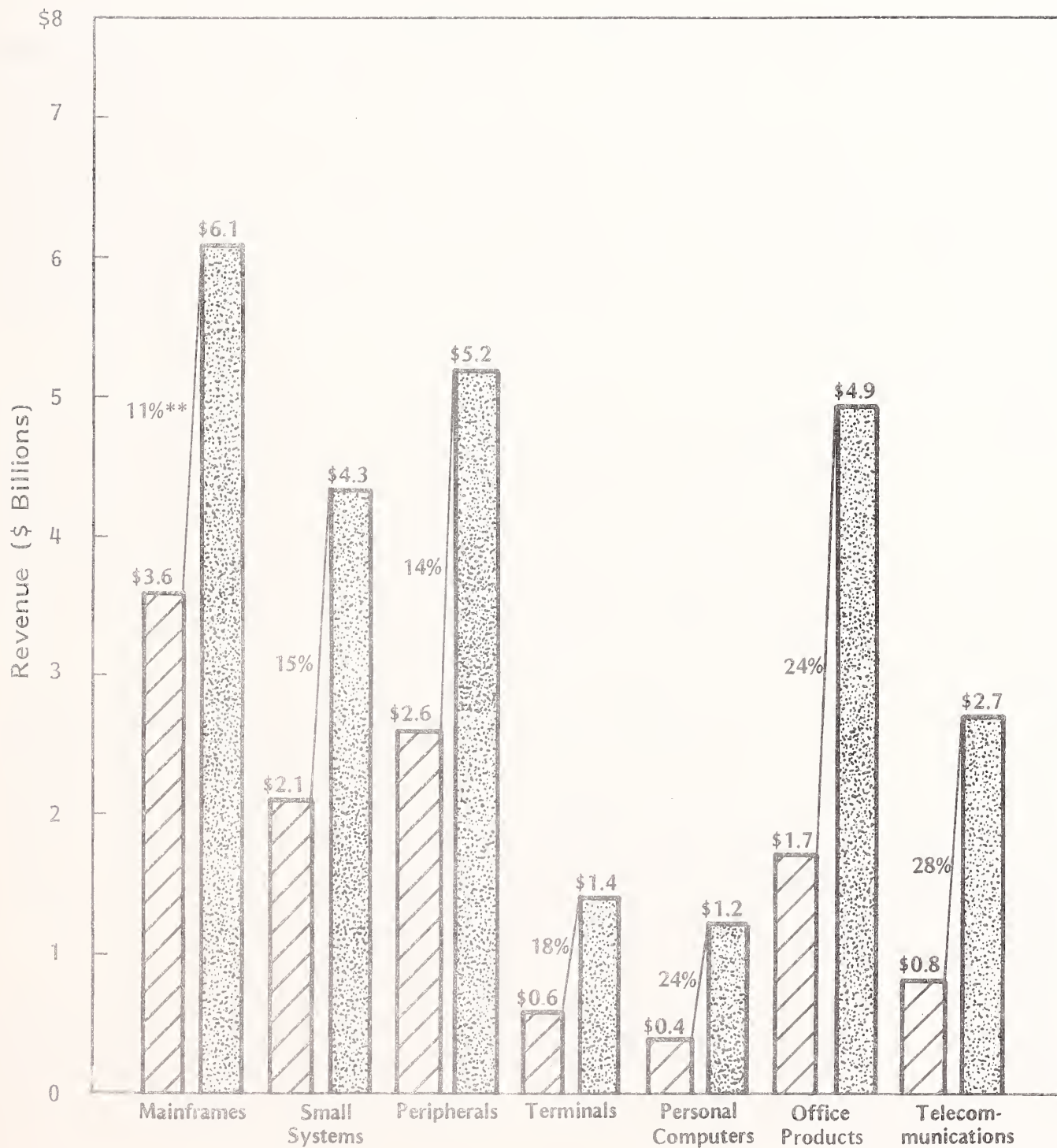
Total Revenue for 1985: \$13.2 Billion



Total Revenue for 1990: \$28.7 Billion

# EXHIBIT III-2

## U.S. MANUFACTURERS SERVICE REVENUE GROWTH, 1985-1990\*



1985

1990

\*Excludes TPM Revenue

\*\*Average Annual Growth Rate

- While mainframe service will shrink as a percent of the total service market, this sector will remain a vital and influential aspect of the industry, capturing over \$6 billion in service revenue. This sector is important beyond the initial revenue it generates in that control of the user's CPU service is essential to prevent customer base erosion in peripherals, terminals, and software service and support.
- Annual growth in the terminals and peripherals market will be limited to 18% and 14%, respectively, through 1990. Terminals will remain one of the smallest service markets and will be subject to intense competition from regional third-party maintenance (TPM) vendors. Peripherals service revenue growth is overshadowed by the fact that this will be a \$5.6 billion market by 1990, second only in size to the mainframe service market. Competition in the terminal service market will keep service profitability low, however.
- Personal computer service will continue to grow at a rapid rate (24% AAGR) despite falling maintenance prices on individual machines. Increased competition from TPM vendors and manufacturers will result in a lower market share for retailers and dealers. However, the continued growth in equipment sales will more than make up for lower service prices.
- The office products service market (excluding PCs) will show steady growth in revenue reflecting growth in the market as a whole. INPUT believes that users in this market will demand a high level of software and hardware support due to their relative inexperience in data processing. Overall, the office product service market will represent 17% of the total service market by 1990.
- Telecommunications is expected to have the fastest annual growth rate (28%) between 1985 and 1990. Growth in this market will be spurred by user demands for network services and the increasing interaction of



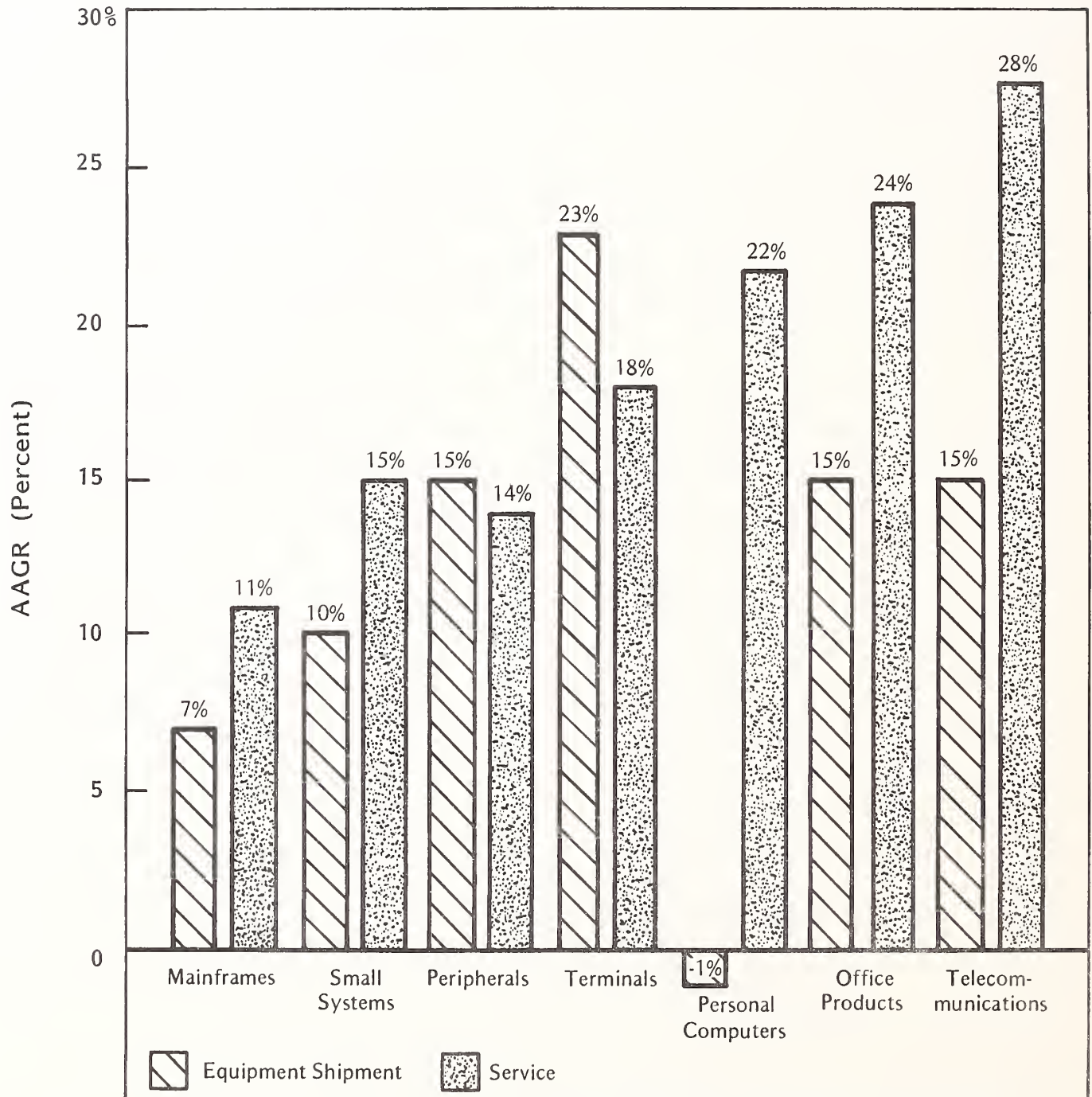
telecommunications and data processing products. As a result of this rapid rate, the market share of the telecommunications service sector will increase from 7% in 1985 to 11% in 1990.

## **B. SMALL SYSTEMS SERVICE MARKET REVENUE, 1985-1990**

- The small systems service market is changing as a result of two important factors:
  - First, more powerful products are being introduced at an increasingly rapid rate. This new equipment typically reflects the latest advances in technology and, as a consequence, provides improved uptime and serviceability at lower costs to the manufacturer.
  - Second, small systems vendors are penetrating nontraditional markets such as office automation, resulting in expanded growth for major vendors (DEC, Wang, IBM, Hewlett-Packard). One result of this expansion has been higher demands for service.
- Service on small systems is growing at 15% annually, but will lose shares to other, faster-growing product sectors by 1990. Within the minicomputer sector, service on superminicomputers and new low-end systems is expected to grow rapidly while service growth on traditional 16-bit systems is expected to remain stable.
  - The rate of small systems equipment shipments is expected to be third slowest in the DP market (see Exhibit III-3). Equipment shipments will grow at a slow rate primarily because of competition from mid-range mainframes and because of the saturation level of the traditional 16-bit market.

# EXHIBIT III-3

## EQUIPMENT SHIPMENT AND SERVICE REVENUE GROWTH, 1985-1990

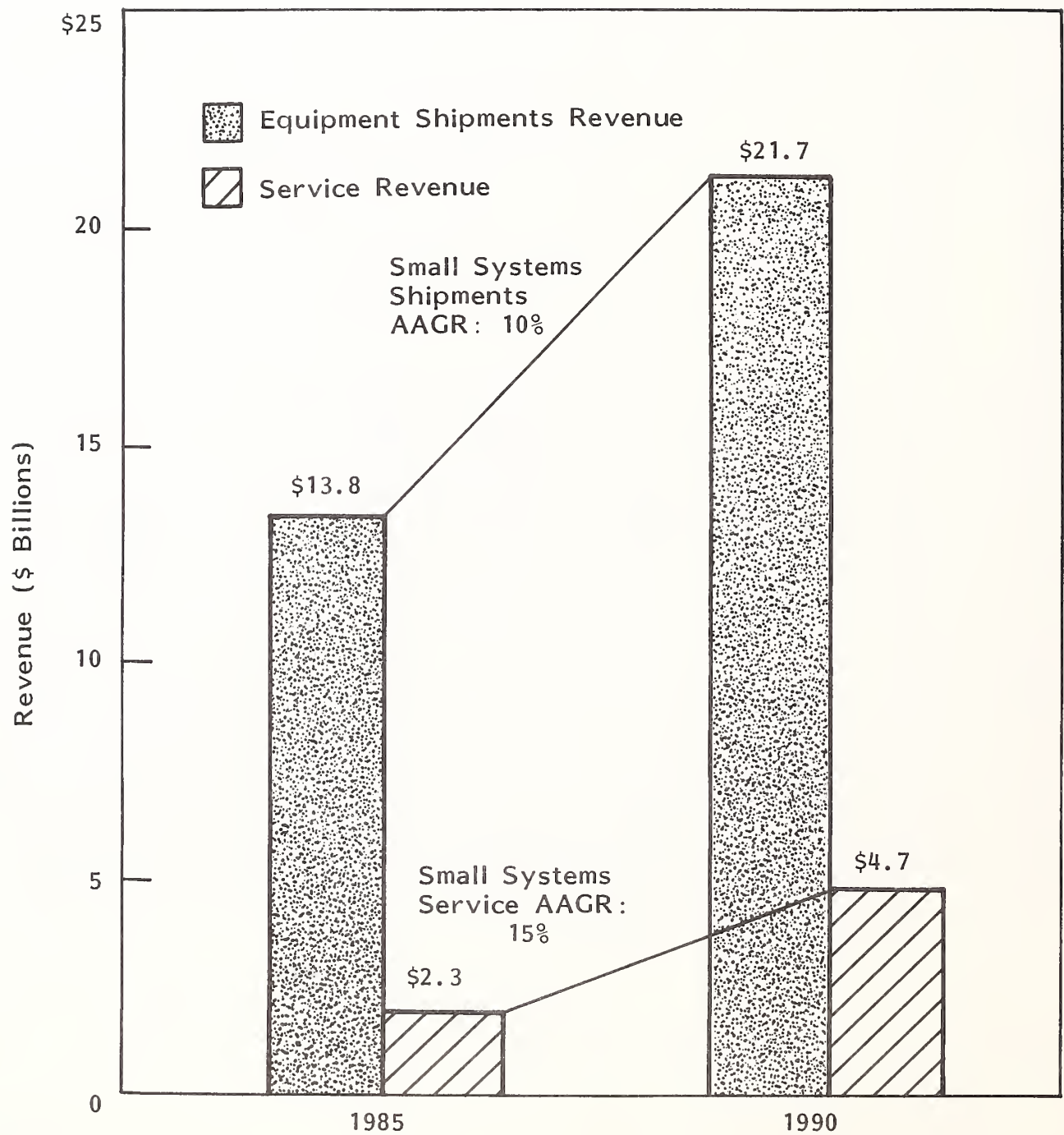


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- The service-to-sales revenue rate will climb from 17% in 1985 to 22% in 1990, two percentage points higher than the expected industry average in 1990 (see Exhibit III-4).
- This increasing rate signals the strong user dependence upon the functionality of equipment for handling business information. User requirements will remain high and lead to new revenue potential for the support and service of small systems.
- The small systems market is not homogenous, however; it ranges from traditional 16-bit minicomputers to 32-bit superminicomputers. These submarkets are very different and sharply defined.
  - Products in the low end of the market offer high reliability and, generally, lower demands for system availability. This coupled with the amount of competition from microcomputer vendors for equipment sales tends to keep service revenue at low levels.
  - The traditional 16-bit minicomputer submarket is large and fairly mature. It is in this sector that users are most vocal in their demands for quality service and increasingly sensitive to service price. TPM vendors have taken advantage of manufacturers' service limitations and in the process fueled both user demands for service quality and competitive prices.
  - Superminicomputers will show the largest service revenue growth during the forecast period. The increasing dependency of these users on more powerful processors generally translates into high demands for service and lower price sensitivity, allowing service vendors, primarily manufacturers, to leverage service revenue to achieve profitability or additional equipment sales.

EXHIBIT III-4

SMALL SYSTEMS EQUIPMENT SHIPMENT AND  
SERVICE REVENUE GROWTH RATES, 1985-1990





- Experience in other service sectors has taught vendors to be less dependent on new equipment sales as the only method of increasing sales. New sources of revenue such as supply sales and add-on services (standby equipment, guaranteed uptime options, consulting, education, etc.) have now become a part of successful service vendors' offerings.
- To lessen the impact of declining equipment sales growth in the small systems market, these service vendors have been identifying new revenue services as well. Service growth from expanding the market with additional services such as planning and consulting, unbundling selected services, and making users pay for higher levels of service will play a major role in the service revenue increases in this market.
- This changing mix of services (depicted in Exhibits III-5 and III-6) will change faster than the industry as a whole by 1990 when the mix is forecast to be 81% hardware maintenance, 11% software maintenance, 5% professional services, and 3% educational services. The share of small systems hardware maintenance is already at the forecasted 1990 industry average, reflecting the current maturity of the market. These services are discussed below:

#### I. HARDWARE SERVICE TRENDS

- Hardware maintenance will continue to dominate this service sector but will lose share to other services, primarily software maintenance and professional services (needs analysis, planning, consulting). Hardware maintenance will reflect an 11% AAGR through the forecast period.
- Hardware maintenance growth will be slowed by decreasing equipment sales growth, falling equipment prices, and competition from TPM vendors. This growth will be realized primarily from market expansion rather than price increases. In fact, service prices through the period will begin to show a decline as the result of several interrelated factors.

# EXHIBIT III-5

## SMALL SYSTEMS CUSTOMER SERVICE REVENUE SOURCE MIX

1985-1990

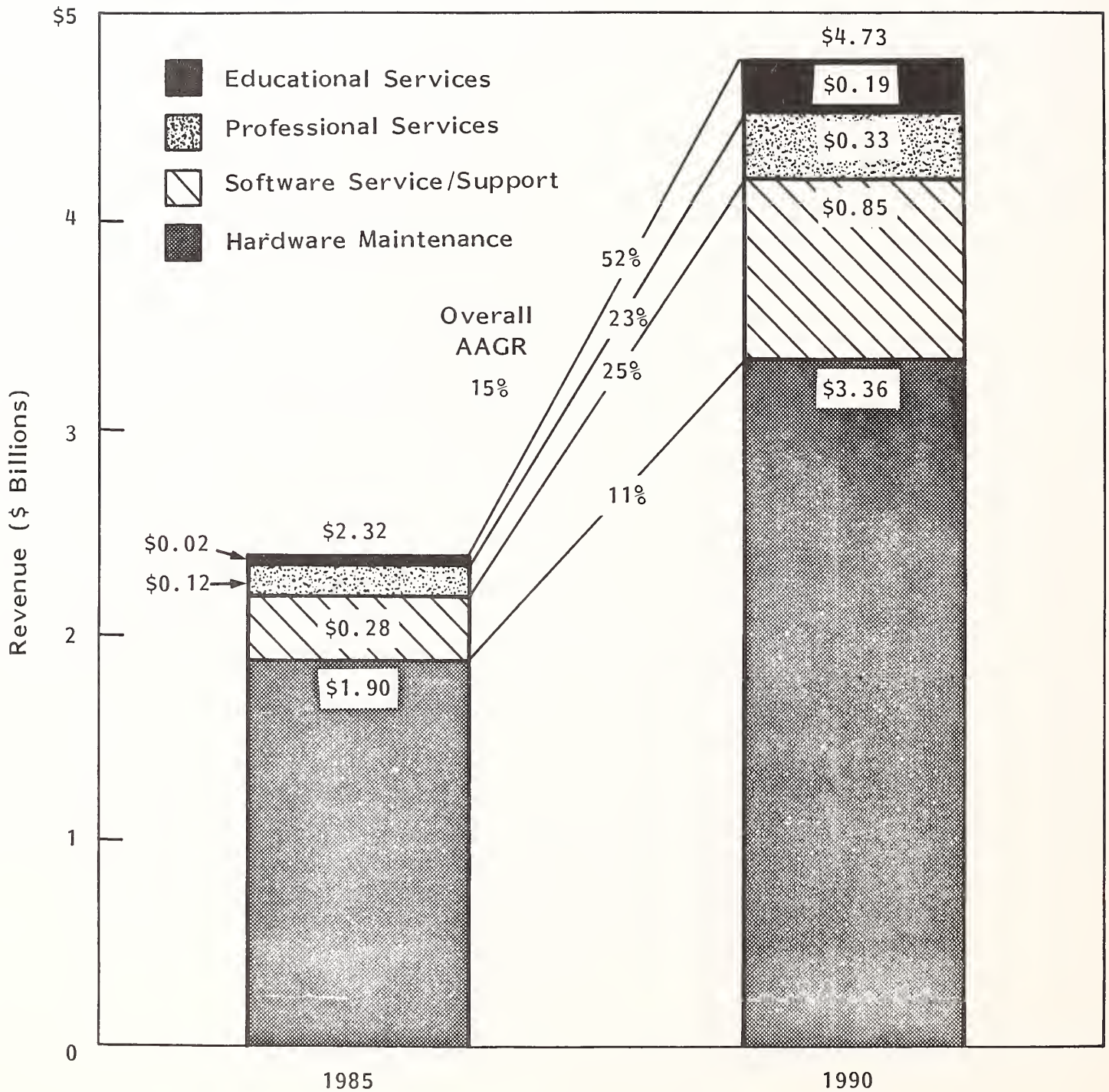
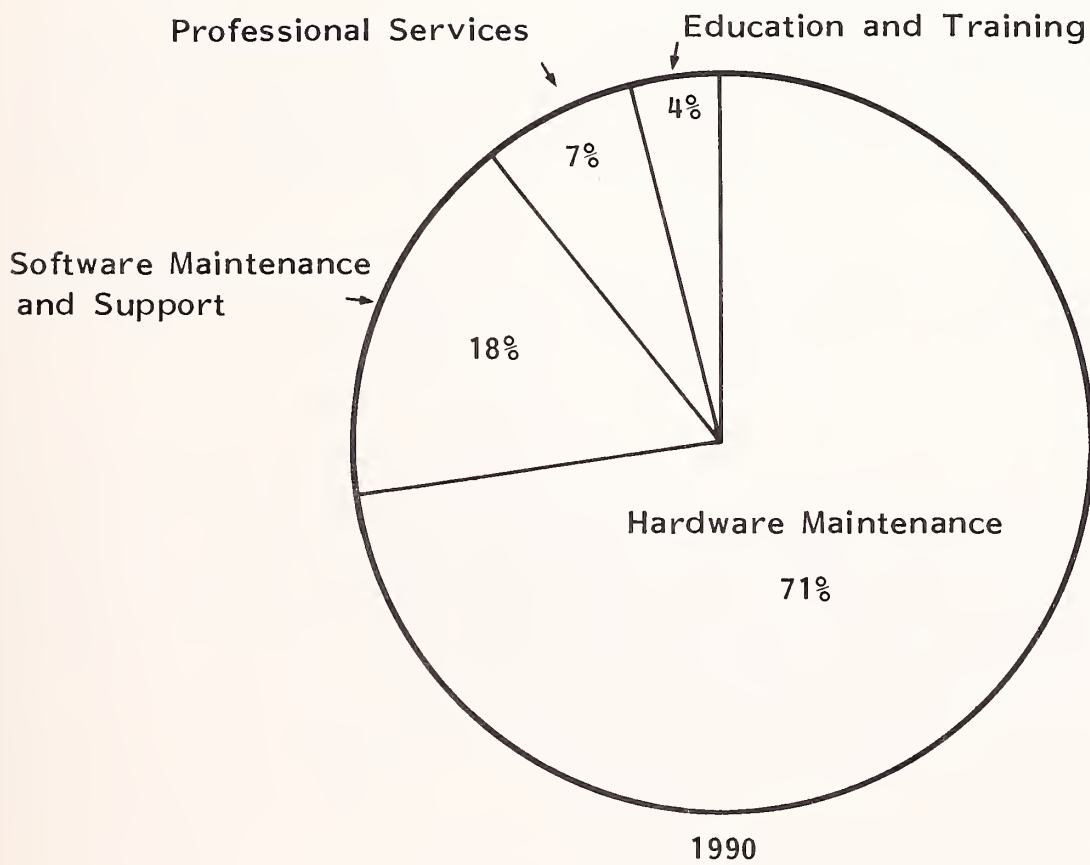
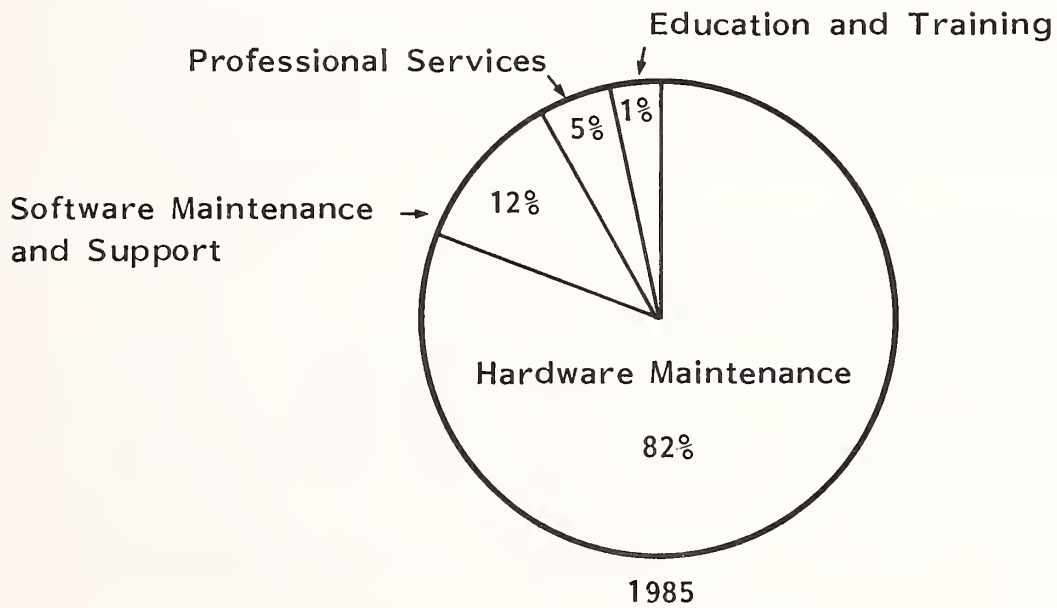


EXHIBIT III-6

SMALL SYSTEMS SERVICE REVENUE DISTRIBUTION





a. More Reliable Equipment

- Manufacturers continue to make technological advances that lower the cost of both producing and servicing products. And, these advances tend to result in more reliable equipment. While advances are providing some margin for service, the competitive nature of this sector forces price cutting.
- Vendors may need to take the technical advances they have used to increase equipment margins into the service organization to lower costs.

b. Growing Price Sensitivity

- Users perceive that service pricing in the small systems market should cost less than it does in other markets, primarily the large systems market that is frequently used as a benchmark. From the users' point of view, small systems require less "hand-holding" (on-site engineers, parts, rigid escalation and dispatching procedures, etc.) than mainframes and so should cost less.
- This is currently mitigated only by the growing user demand for supermini-computers. Dependence in this arena has increased user perception of the value of service required to maintain equipment and made users less price sensitive.
  - Hardware prices will continue to decline and users will expect service prices to fall in line with this.
  - As equipment becomes more reliable, users will become more reluctant to spend ever-increasing amounts for fewer required services. Customers will expect vendors to "hold the line" on service prices because they believe service costs should fall as a result of fewer service calls.

c. Price As a Competitive Weapon

- Increased serviceability of equipment resulting from improved modular design, remote support, and redundant systems could lower costs and permit more competitive pricing.
- However, manufacturers use service pricing on older models as leverage for upgrades and force price-conscious users to consider alternative hardware or service vendors. This is a place TPM vendors can assert themselves.
- Only for superminicomputers, where the perceived value of service is high and the customer is less sensitive to price, will vendors be able to increase service prices and improve profitability. This may be a dangerous strategy, however, as low-end mainframe vendors will use service price as a competitive weapon for equipment sales in the small systems market.

2. SOFTWARE SERVICE TRENDS

- INPUT estimates that software service revenue will increase 25% annually and become an \$850 million market in 1990. This growth will be primarily fueled by the increasing integration of functions within the total systems environment.
  - Some of the new nontraditional markets being entered by vendors (manufacturing, education, office automation) require higher levels of service and support.
  - With the growing data processing integration will come user requirements for software and service and a willingness on the part of some users to pay premiums for improved software support, especially with the more complex machines and integrated uses. The forecast period should witness steadily increasing prices as vendors capitalize on these trends.

- Software maintenance and support will become increasingly important as manufacturers expand vertically. And as this software complexity increases, users will defer more and more to the service vendor's software support organization if that organization has the capability to meet users' needs.

### 3. PROFESSIONAL SERVICES TRENDS

- Professional services such as consulting, planning, needs analysis, and site management is a relatively small market but is growing (23% AAGR) and is expected to have a sizeable impact on small systems services with an estimated \$330 million in revenue realized in 1990. Professional services will be increasingly required as users adapt to multi-systems environments and as they seek additional functionality (distributed processing, micro-to-mini-computer applications, etc.) in a multi-vendor environment. Systems integration and site management should be key services.
- The importance of professional service is not centered around revenue alone, however. A number of vendors report that professional services, such as consulting and planning, are important primarily because of their effect on other factors, such as purchase of equipment and additional services. INPUT believes that the ability to influence customer decisions is the main benefit of expanded professional service offerings.
- Pricing in this market is unlikely to increase dramatically but profit margins should grow, primarily as the result of increased revenue from unbundled service at a time when the costs of services are only gradually rising. This scenario could change, however, as manufacturers look to professional services to differentiate themselves from hardware-only services vendors and as they drop prices as a means to that end. Costs also could escalate as vendors are required to become proficient in a multi-vendor environment.

- Service vendors will eventually be forced to unbundle a number of services to remain price-competitive and to accurately assess the costs of individual services.
- By unbundling nonessential services, vendors hope to accomplish a number of objectives.
  - To increase revenue by charging for services which were previously included in basic support contracts.
  - To improve user perception of service flexibility by providing more service options.
  - To enhance the manufacturer's competitive position, particularly in relation to TPM vendors, by maintaining low basic service prices with an option for higher levels of service depending on the individual user's requirements.
  - To underscore the importance of professional services as a separate and identifiable service option.

#### 4. EDUCATION AND TRAINING SERVICE TRENDS

- Education and training services will also be a significant revenue generator during the forecast period although it will grow from a small base of \$20 million in 1985 to \$190 million in 1990. Demand will be stimulated by the continuing changes in small systems, penetration into the non-data processing departments, and the resulting need to train users in their utilization and application. A variety of training mediums will be employed with live instruction most common, videotape and paper-based systems second, and computer-aided instruction/computer-based training (CAI/CBT) third.



- Vendors are likely to continue to "give away" these services since doing so engenders good will and increases user satisfaction. Although the price of educational services will not increase dramatically, costs of developing and administering products and services will fall, creating a favorable profit picture.

### C. SMALL SYSTEMS SERVICE VENDORS

- The small systems market is dominated by value-added resellers (VARs) and systems integrators who make use of minicomputer processors to drive either specialized, dedicated hardware systems or application-specific software systems. DEC processors predominate, but large volumes of IBM, H-P, Perkin-Elmer, Data General, and Prime processors are also used in this manner. Few of these VARs actually service the hardware they sell, but they do provide software maintenance.
- Manufacturers are relying less on OEM and value-added dealers, bypassing them to achieve direct access to high-growth markets such as CAD/CAM and office automation. Manufacturers are focusing on vertical market integration, and this integration is taking the critical component, software, out of the hands of independent software vendors.
- To a lesser extent than for mainframes, small systems service is a means to exercise account control, resulting in increased sales of peripherals and service at the user's site.
  - As the market for small systems is encroached from the top and bottom, small systems manufacturers are beginning to use their service offerings as a major competitive weapon. These vendors are learning that service is essential to long-term growth.

- Small systems hardware vendors have become dependent on their services network to maintain high levels of customer satisfaction, to support initial sales, and to provide total post-sales support. Leading vendors such as DEC, DG, and Wang are placing new emphasis on service revenue as a means to bottom line growth.
- As demonstrated in Exhibit III-7, service represents an increasingly important component of small systems vendors' revenue. Service revenue ranges from a low of 9% of total revenue for CDC to a high of 38% for Honeywell. On average, small systems vendors derive about 21% of their total revenue from service-related functions.
- Service revenue growth between 1983 and 1984 (the latest data available) improved for most vendors. Wang continued to be the high flyer in terms of service revenue growth with a 66% increase. Burroughs, on the other hand, suffered one of the slowest growth rates (4%) as a result of declining market share in small systems.
- 1985 should be an excellent year for most small systems vendors in service growth. But, competition for service will increase as vendors increase their reliance on service for revenue growth.
- Exhibit III-8 demonstrates the relationship of service growth to overall service revenue for the top ten computer manufacturers over the past four years.
- When equipment sales revenue begins to fluctuate, the seemingly "recession-proof" services business is perceived as a means of stabilizing revenue. Service also has become important both as a means of containing erosion of the installed base and for account control that leads to potentially more profitable add-on sales and service.
- One disturbing characteristic illustrated is the erratic fluctuation in service revenue growth from one year to the next. This fluctuation



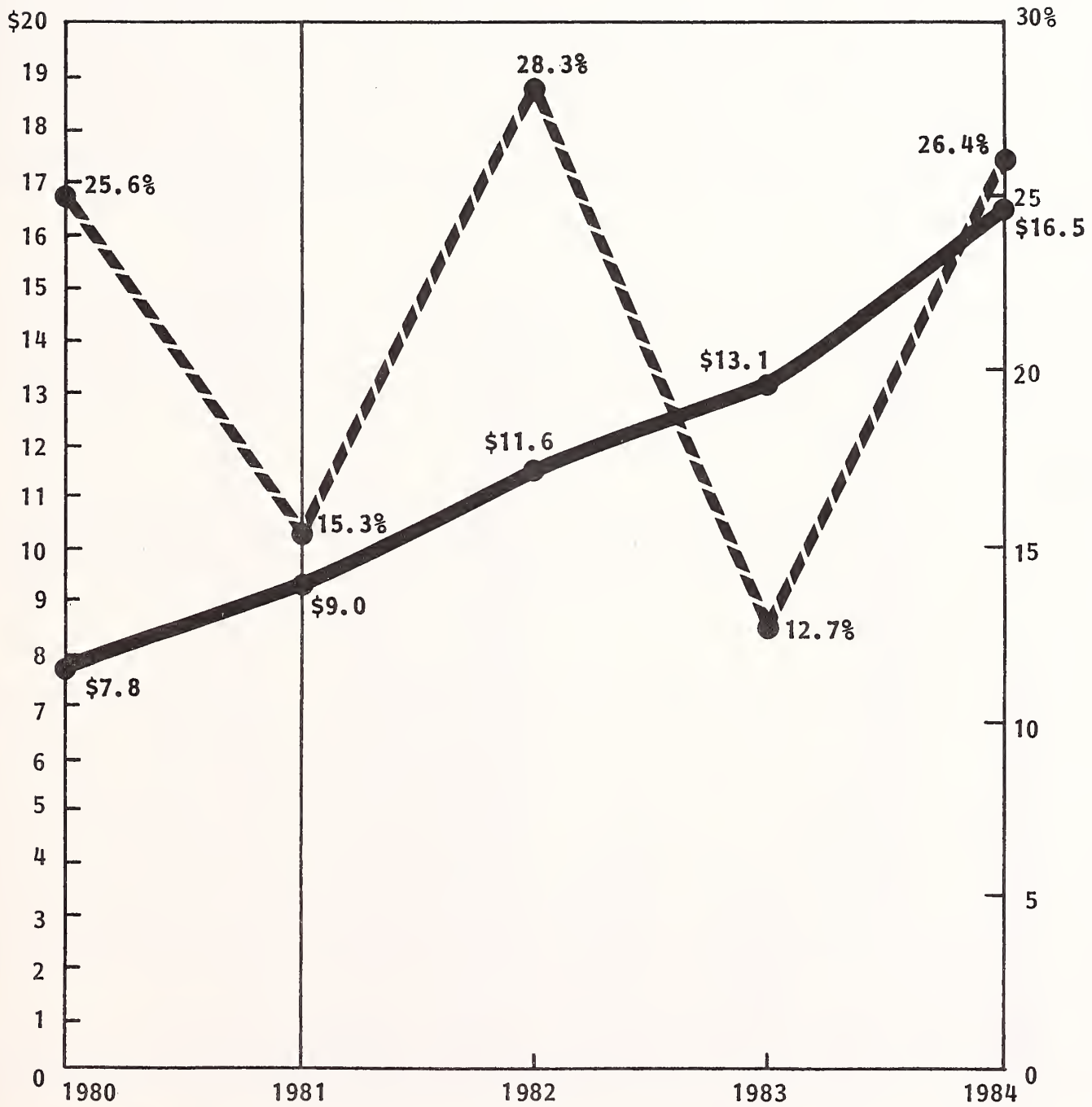
## EXHIBIT III-7

## SMALL SYSTEMS VENDOR SERVICE REVENUE, 1984

	Total Information Systems Revenue (\$ Millions)	Estimated Customer Service Revenue Worldwide (\$ Millions)	Customer Service Growth Rate 1983-1984 (Percent)	Customer Service as a Percent of Total Information Services Revenue 1983
Burroughs	\$4,876	\$1,112	4%	23%
Control Data	3,756	349	7	9
Data General	1,161	251	27	22
DEC	5,584	1,420	35	25
Hewlett-Packard	3,300	530	16	16
Honeywell	1,825	696	18	38
IBM	45,937	9,605	25	21
NCR	4,100	1,300	8	31
Perkin-Elmer	233	56	21	24
Prime	613	164	31	27
Tandem	533	84	45	16
Texas Instruments	1,070	125	19	12
Wang	2,185	365	66	17

# EXHIBIT III-8

## WORLDWIDE SERVICE REVENUE GROWTH OF TOP TEN COMPUTER MANUFACTURERS



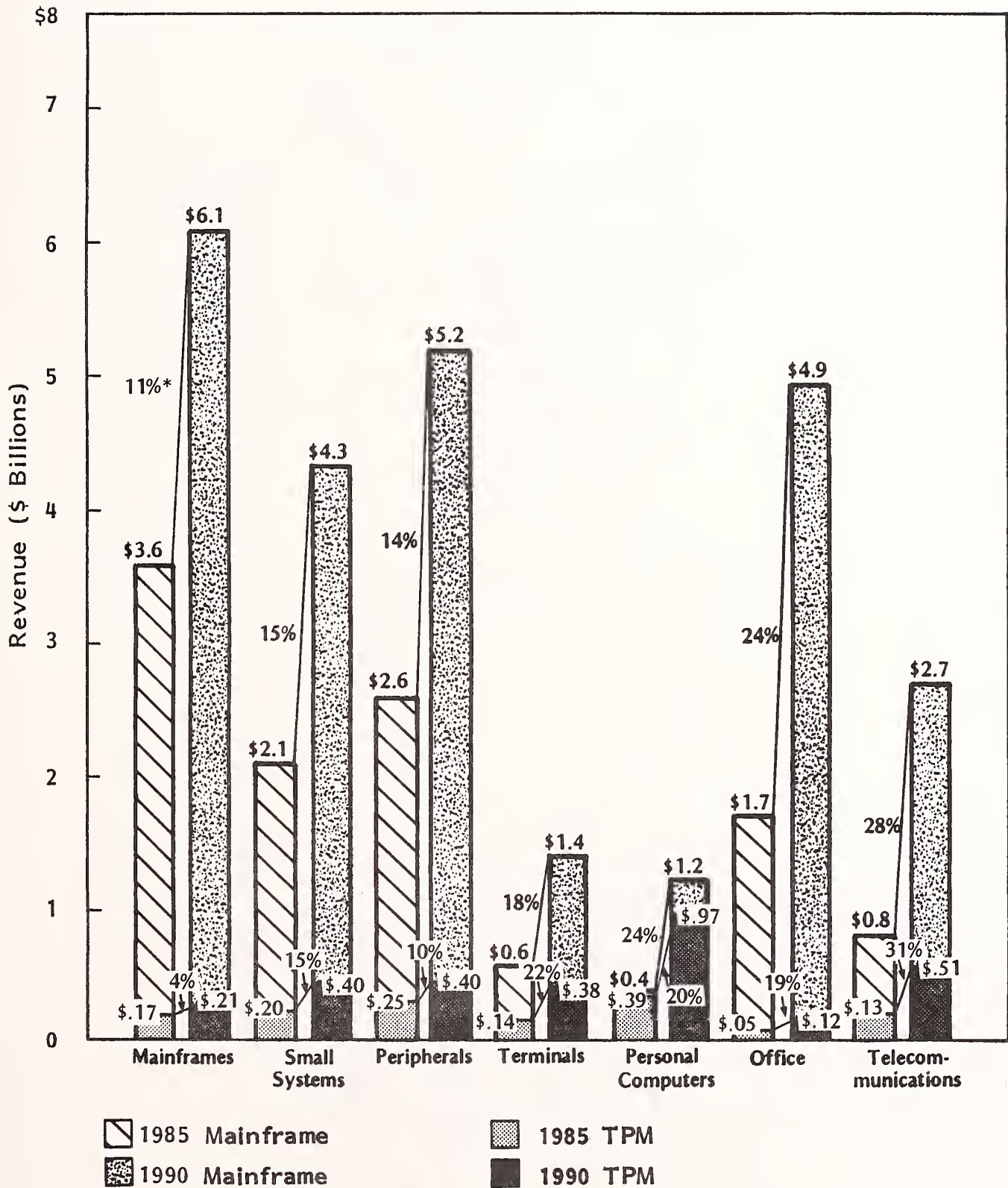
Service Revenue  
 Service Revenue Growth Rate

has, in the past, been caused by the interdependence of service growth on hardware sales. Several vendors such as IBM and DEC are reducing this interdependence so that service growth can be planned. These vendors still experience significant variations in growth, but the variations are generally less severe.

- TPM vendors, like manufacturers, have identified the CPU as essential to account control. They are very price competitive to gain access to the potentially more profitable peripherals service market. For the overall service market, the share captured by third-party maintenance providers will remain near the 10% level throughout the forecast period (see Exhibit III-9 for revenue and growth data by type of vendor and Exhibit III-10 for market share data).
- Revenue for small systems service provided by manufacturers will grow at 15% AAGR, equal to the growth rate for third-party maintenance (TPM) vendors. The result will not change the near 92% market share for manufacturers (see Exhibit III-11).
  - The large installed base and dense population of small systems are service market characteristics that aid TPM vendors, not manufacturers.
  - In the mid-range of the small systems service market, TPM is sustained by ready market among users of obsolete equipment. Although manufacturers may not have abandoned this equipment, TPM can be competitive because of a ready supply of skilled engineers and parts. The growing segment of price-sensitive users provides additional opportunities for vendors who can deliver better-than-average response time, either because of advanced diagnostics or geographic proximity.
  - The newness of superminicomputer equipment, its rapidly changing technology, and the desire of manufacturers to limit service competi-

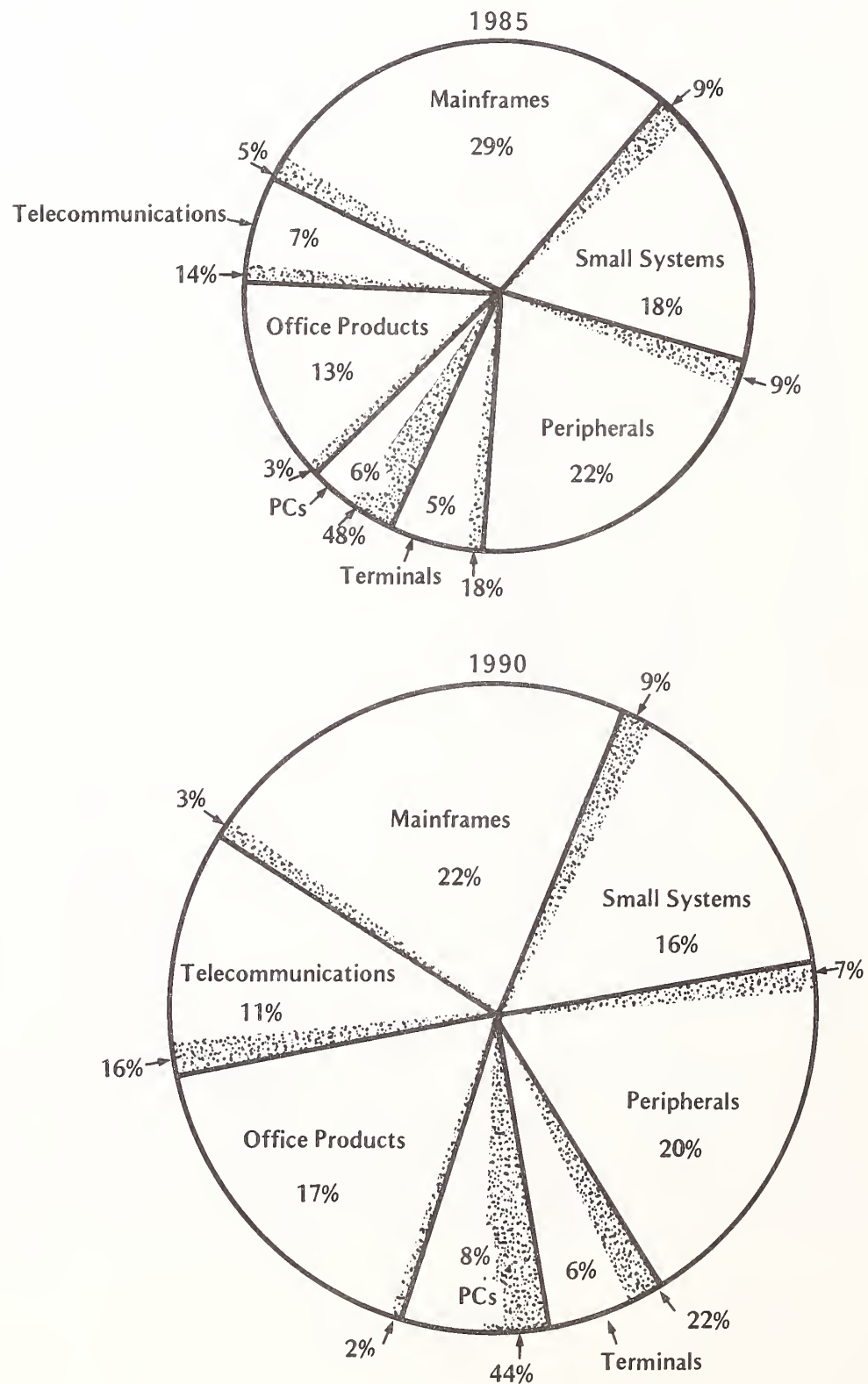
# EXHIBIT III-9

## U.S. SERVICE REVENUE GROWTH BY TYPE OF VENDOR, 1985-1990



# EXHIBIT III-10

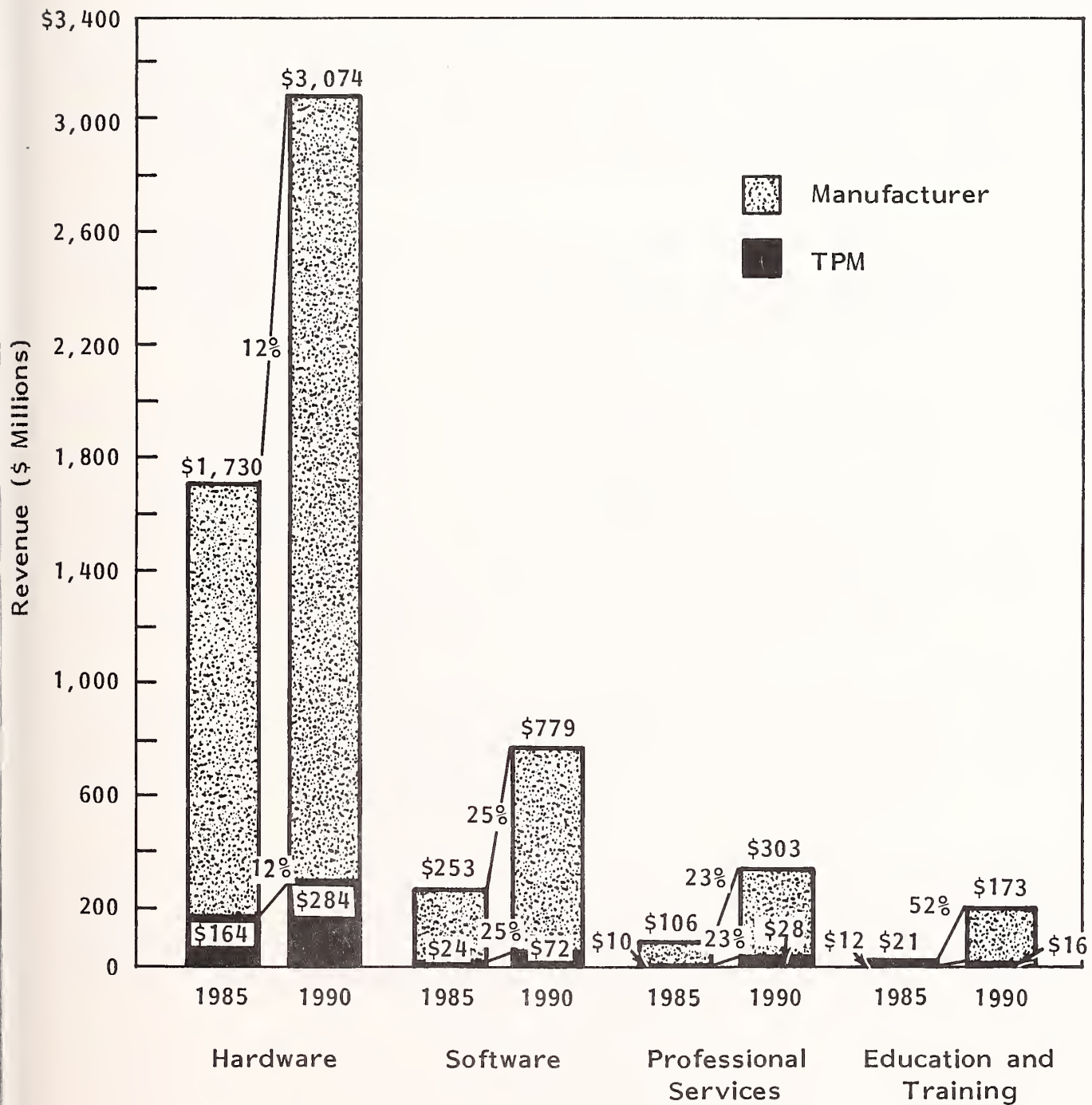
## CUSTOMER SERVICE REVENUE DISTRIBUTION BY TYPE OF VENDOR





# EXHIBIT III-11

## SMALL SYSTEMS SERVICE REVENUE MIX BY TYPE OF VENDOR





tion will result in reduced availability of parts and diagnostics to nonmanufacturing service organizations (i.e., TPM vendors) in this high end of the market.

- TPM vendors compete primarily in hardware and are at a disadvantage because of increasing cost of parts and lack of diagnostics. When TPM vendors do develop diagnostics, they are usually introduced long after the manufacturer's remote support is available.
- TPM growth is also limited because users require single-source vendors who provide a full range of hardware and software services and who are not limited to the hardware-only service typically offered by TPM.
  - Currently, few TPM vendors offer integrated maintenance (i.e., hardware, software, consulting, etc.) and, consequently, TPM penetration in sectors of this market is limited.
  - A complete single source of maintenance has a strong attraction among both users and VARs, but it is also an area dominated by manufacturers. Although manufacturers have not made a great deal of progress in developing sole-source maintenance programs, users are likely to continue to demand integrated, multi-vendor support--a service which will be extremely difficult for all but the largest TPM vendors to offer.
  - Manufacturing service organizations are increasingly competitive. They have unbundled services like planning and consulting to be more price competitive. Users requiring these services must pay a premium.
- The overall market for third-party maintenance on small systems is currently \$200 million, approximately 9% of the total small systems service market. Most of this revenue is derived from single CPU sites, particularly when the system is four or more years old.

- Although TPM vendors have had an impact on DEC service revenue, TPM growth on DEC equipment has slowed. DEC has begun to protect its installed base by increasing support for noncompetitive, non-DEC peripherals attached to DEC CPUs. In addition, DEC is strengthening its OEM service agreements to prevent customer base erosion from this group.
- Despite lower price/performance ratios from their hardware, IBM is currently protected by users' high regard for IBM in general and the level and quality of IBM service in particular. Customers continue to be reluctant to use outside suppliers for anything, service included. In addition, IBM has priced its service very competitively, making it extremely difficult for TPM vendors to use price to gain access to the IBM market.
- Data General is the smallest of the three major minicomputer vendors seriously affected by TPM encroachment. Although DG's installed base can hardly support a vast TPM market, competition exists because users, historically, did not receive the service they demanded from DG since the company expected its users, primarily technical/engineering customers, to perform at least some of their own maintenance.
- As manufacturers continue to exploit the market, they will employ a variety of strategies that will result in more rapid growth in service revenue.
  - Promotion as a single source of service (hardware, software, professional services, education) for the manufacturer's equipment and, eventually, a full-service supplier for the user's multi-vendor environment.
  - Unbundling of services that not only lowers the price of "basic" services but also provides additional revenue, some of which is at premium prices.

- Competitive prices that are the result of a growing volume of service business and operational efficiency (e.g., remote support and tele-marketing activities that reduce the most expensive component of service--the on-site call).
- Introduction of new products that not only advance technology but threaten the very survival of service competitors.
- To combat these strategies, third-party vendors need to identify and exploit such market niches as:
  - Users of obsolete equipment (or older equipment that is not compatible with newer equipment) where service is otherwise not available or the manufacturer is not price competitive.
  - Price-sensitive users who believe the manufacturer's "competitive" prices are still too high.
  - Users who require better-than-average response/repair time. (TPM vendors that can improve on response time either through advanced diagnostics or geographic proximity may have a substantial advantage.)
  - Users who require planning, consulting, and software support that is extensive and beyond the scope of other service vendors.

#### IV IMPACT OF USER SERVICE REQUIREMENTS



## IV IMPACT OF USER SERVICE REQUIREMENTS

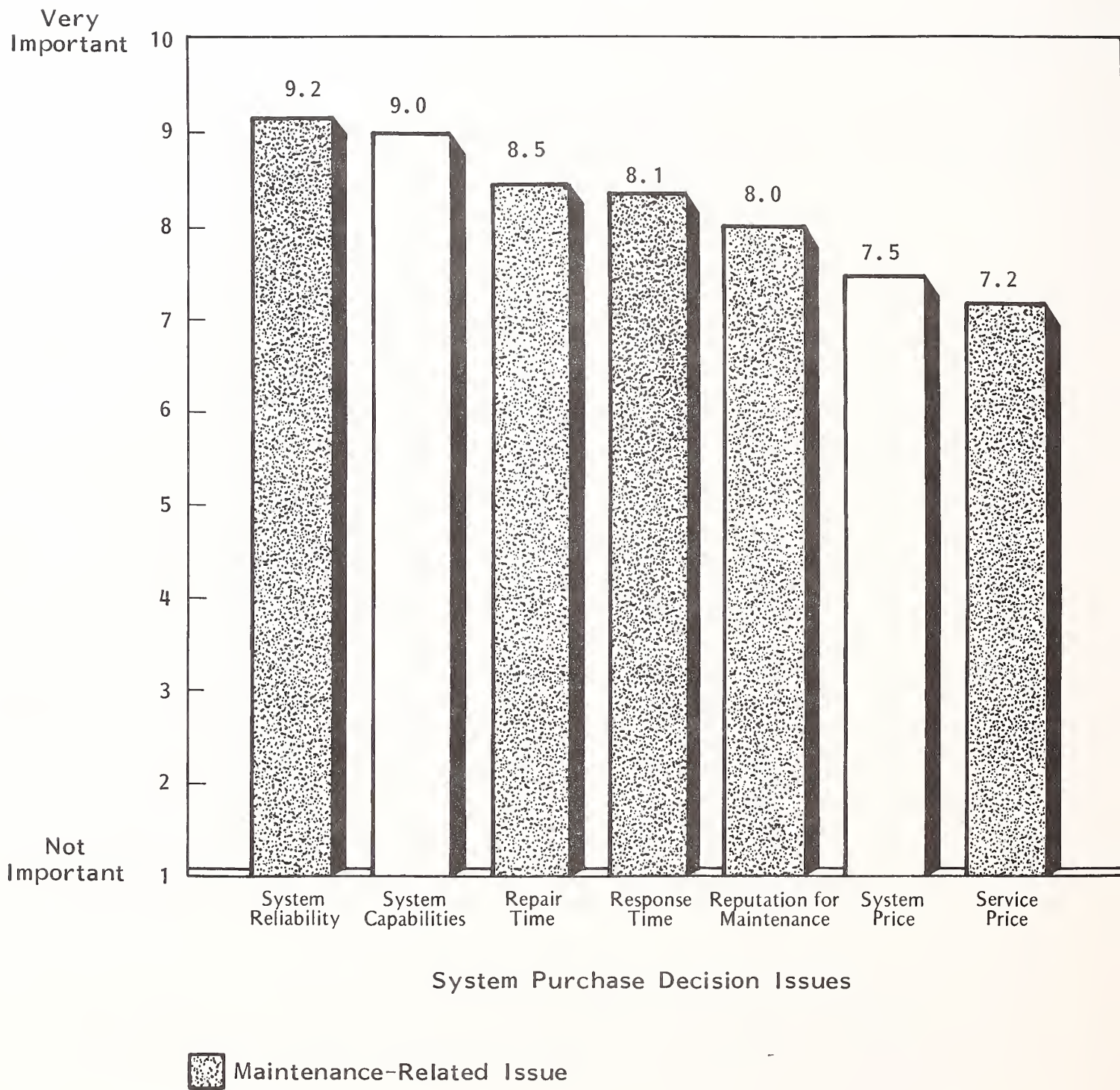
### A. THE IMPORTANCE OF MAINTENANCE IN PURCHASING DECISIONS

- As small systems have become more important to revenue generation and information management, users have heightened their expectations for both equipment reliability and maintenance services that will ensure an even higher level of availability. These levels of importance are highlighted in Exhibit IV-1 which depicts users' rankings of several issues related to equipment purchase decisions.
  - Service issues such as systems reliability and response and repair time are just as important to users' purchase decisions as non-maintenance considerations (e.g., systems capabilities and price).
  - Users' rating of service price as the least important consideration is somewhat misleading. While price is a secondary issue in most purchasing decisions, it is nonetheless very important to users. The quality of service, as measured by response/repair time, and the maintenance reputation of the vendor outweighs cost, but users are demanding that costs be held in line with user service needs and vendor service costs.
- While small systems users have typically had less pressing requirements for service than users of the more costly mainframes, increased user interest in



## EXHIBIT IV-1

### IMPORTANCE OF MAINTENANCE TO SMALL SYSTEMS USERS



and sophistication about service has led to the growing influence users are exerting on vendors' service-related business decisions. Perhaps the most important trend in the service market is the growing impact of user service requirements. The era of the passive service customer is gone and will, in all probability, never return. In its place are coming more active and involved users who are driving the service market in several areas, including service pricing, service support flexibility, response time, etc.

- While some vendors may take an impervious attitude and ignore user demands, successful vendors will attempt to understand the users' needs and design service programs around them.

## **B. USER SATISFACTION LEVELS**

- Based on reports from small systems users, the percentage of time systems that were available increased between 1984 and 1985 (see Exhibit IV-2). Fewer interrupts and dramatic increases in response times contributed to greater availability. Repair times for both hardware and software problems were reduced, but the magnitude of reduction was not nearly as dramatic. Repair time for software, in particular, was only reduced 10%, reflecting an area of user concern.
- But even with these improvements, increases in user expectations outstripped vendor performance in almost all aspects of the small systems market and resulted in lower-than-expected user ratings (see Exhibit IV-3).
- Exhibit IV-4 shows this increased level of user dissatisfaction. The only measures to show positive increases in user satisfaction in 1985 were documentation and training, with the remaining ratings reflecting moderately increasing user dissatisfaction.

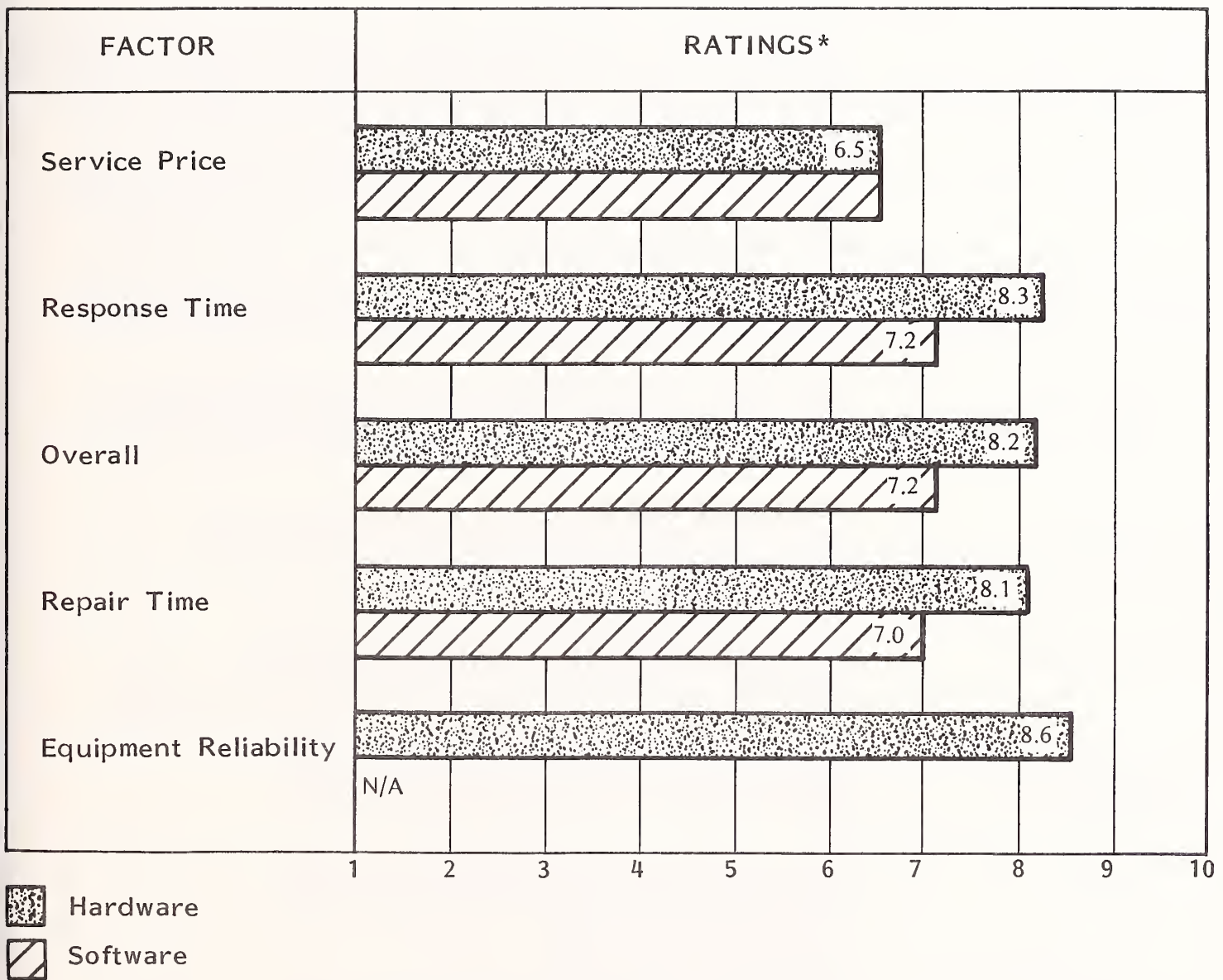
## EXHIBIT IV-2

## MEASURES OF SMALL SYSTEMS SERVICE

SERVICE MEASURE	1984 Hardware	1984 Software	1985 Hardware	1985 Software
Average System Availability (Percent)	92%	-	96%	-
Average Number of Interruptions per Month				
Hardware: Percent of Interrupts	74%	-	65%	-
Interrupts per Month	20	-	1.2	-
Software: Percent of Interrupts	-	26%	-	35%
Interrupts per Month	-	0.7	-	0.6
Average Response Time (Hours)	6.1	11.1	3.6	7.4
Average Repair Time (Hours)	5.5	17.4	3.9	15.7

# EXHIBIT IV-3

## USER RATINGS OF GENERAL CHARACTERISTICS OF SERVICE



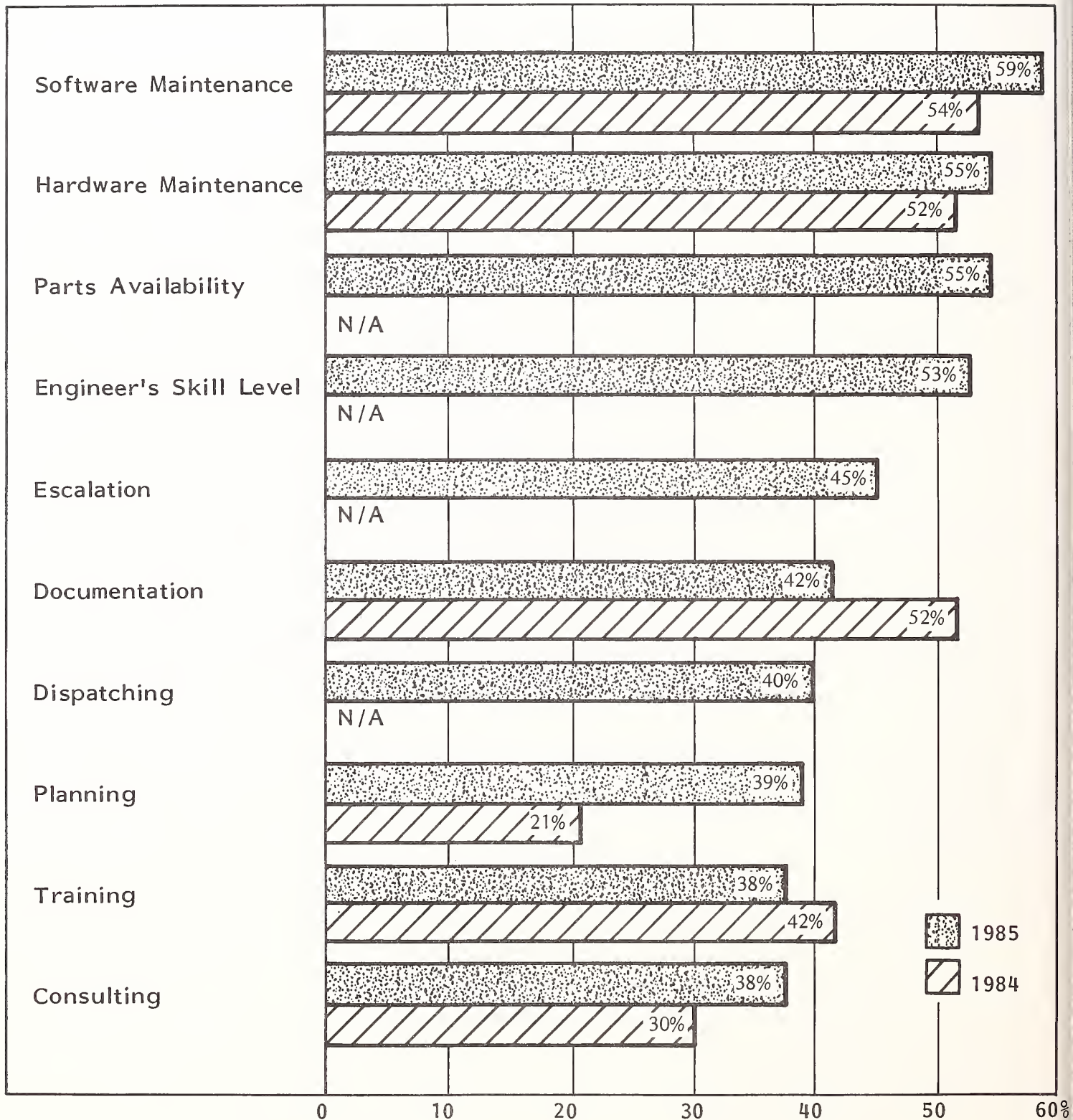
\*Rating: 1 = Low Satisfaction, 10 = High Satisfaction



# EXHIBIT IV-4

## USER DISSATISFACTION WITH SERVICE INCREASING

Percent of Users Satisfied



- User dissatisfaction with planning services increased most dramatically, perhaps the result of more users looking for additional support from vendors at a time when vendors have either not begun to offer such services or have not yet concentrated on providing the quality of service that users expect.
- User priorities for service continue to center on direct-action services such as well-trained and knowledgeable field and software engineers, immediate accessibility to parts, and dispatching/escalation. Vendor performance for these high-requirement services does not measure up to user expectations for service, resulting in a higher level of user dissatisfaction with overall service. Not one vendor exceeded user expectations for service, resulting in an average user satisfaction rate of just 45%.
- Almost 60% of users are dissatisfied with software support, and satisfaction is declining rapidly as user expectations for service have increased. Less than one-third of all small systems users surveyed are satisfied with software documentation, and a majority of users are dissatisfied with all software services except consulting.
  - The vast majority of small systems users are dissatisfied with both the quality and quantity of systems software support they are receiving. Only one vendor, Four-Phase, exceeded user expectations in this category.
  - Software documentation is a key problem area. Little more than 30% of the small systems users reported satisfaction with the documentation, although this software service component is the single most important software service requirement users have.
  - Users also report dissatisfaction with the support and skill levels of the vendor's software engineers. This dissatisfaction may retard the growth of remote software support where the levels of communications and engineer visibility are reduced.



- Dissatisfaction with vendor-supplied systems software support has led to increased user interest in self-maintenance of software products. Hewlett-Packard and Prime users, for example, believe this is almost a necessity. Most users prefer not to get involved in software self-maintenance, but would if the vendor provides the proper inducements (discounts).
- Professional support services (e.g., training, planning, consulting, etc.) are secondary services in the opinion of small systems users.
  - It is in these areas that small systems service vendors are "over-achieving." Users rate their own requirements for these services at 20-30% lower in importance than the high-priority services and are generally satisfied with the support they are receiving in these low-priority areas. Well over 60% of the users expressed satisfaction with such services as planning, consulting, and training.
  - A number of vendors have succeeded in increasing user perceptions of importance of selected lower-priority services. This has had a very positive effect on user satisfaction levels.

### C. VENDOR SERVICE PERFORMANCE AND USER RATINGS

- Vendors report that it is particularly frustrating to improve service quality by, for example, 20% only to find users increasing expectations for service even more, say 30%. The net result, of course, is increased user dissatisfaction despite substantial improvements by the vendor. Prime, for example, improved software service by 34% and still had a low satisfaction rating because user expectations for service increased by 42%.

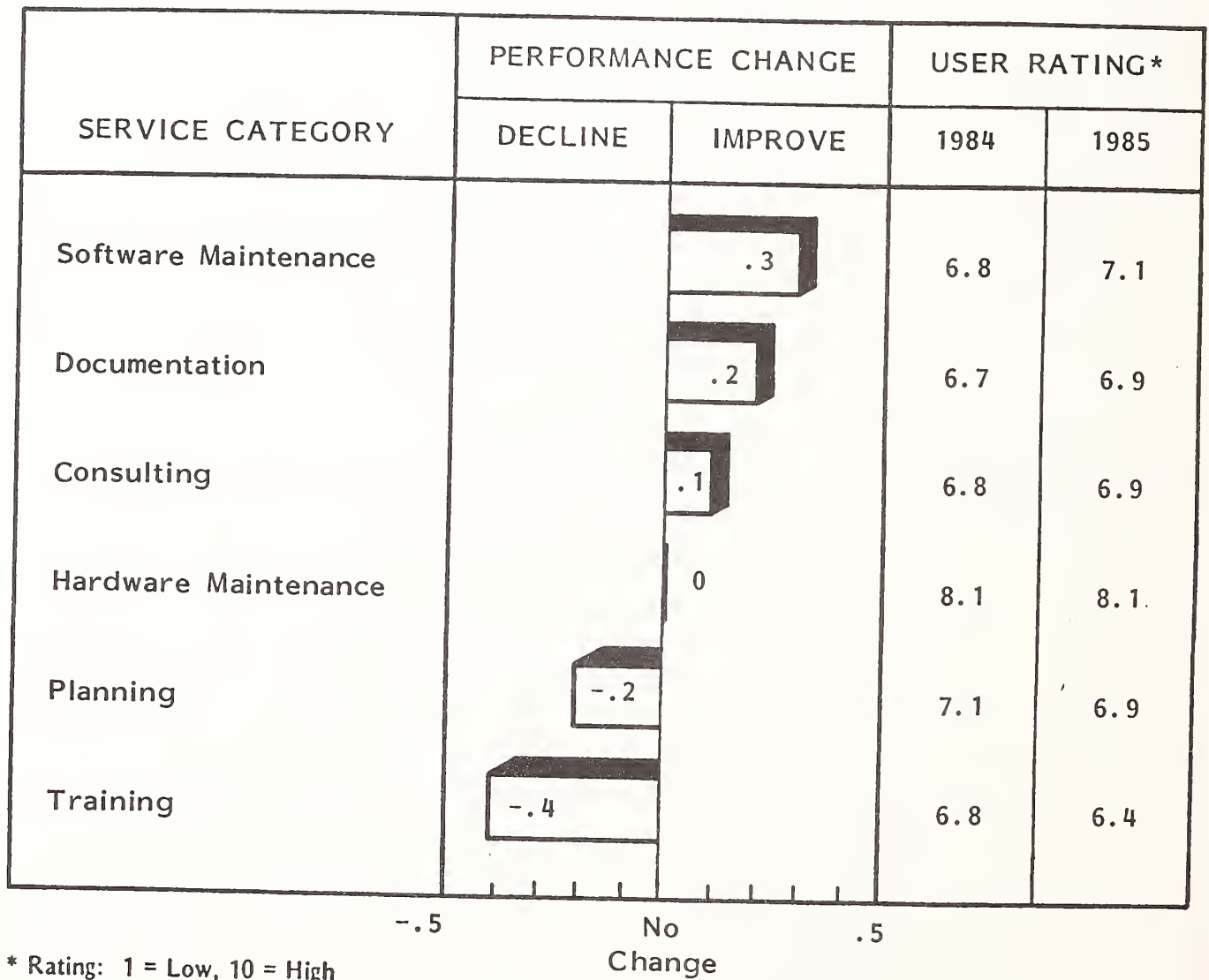
- The 32-bit superminicomputer vendors have become very susceptible to increasing user expectations as vendors move into nontechnical markets such as office automation. Non-hardware demands such as systems software support have increased very rapidly as the complexity of the equipment and the software has grown.

## I. VENDOR STRENGTHS AND WEAKNESSES

- Exhibit IV-5 depicts the improvements vendors made between 1984 and 1985. Juxtaposed with satisfaction levels, this exhibit highlights the growing discrepancy between what users require and what vendors deliver. Software maintenance, for example, showed the most improvement but was also the source of the most dissatisfaction. The low-priority service of training, on the other hand, showed a performance decline and an increase in the number of satisfied users. Taken together, these two examples provide evidence that vendors and users are "in tune" with respect to targets for change in service (both positive and negative). The difference lies in the speed with which vendors' performance changes versus users' requirements change.
- What users require in performance is compared to what users receive in Exhibit IV-6 for hardware service issues and Exhibit IV-7 for software service.
  - Vendors are "overachieving" in hardware consulting and training, but "underachieving" in every other category. Of particular concern to users is the quality of hardware service overall, FE skill level, and parts availability. In as much as these are high-priority areas that greatly impact overall vendor ratings, these areas are prime targets for vendor improvements.
  - As discussed earlier, vendors are not meeting user expectations in any software category.

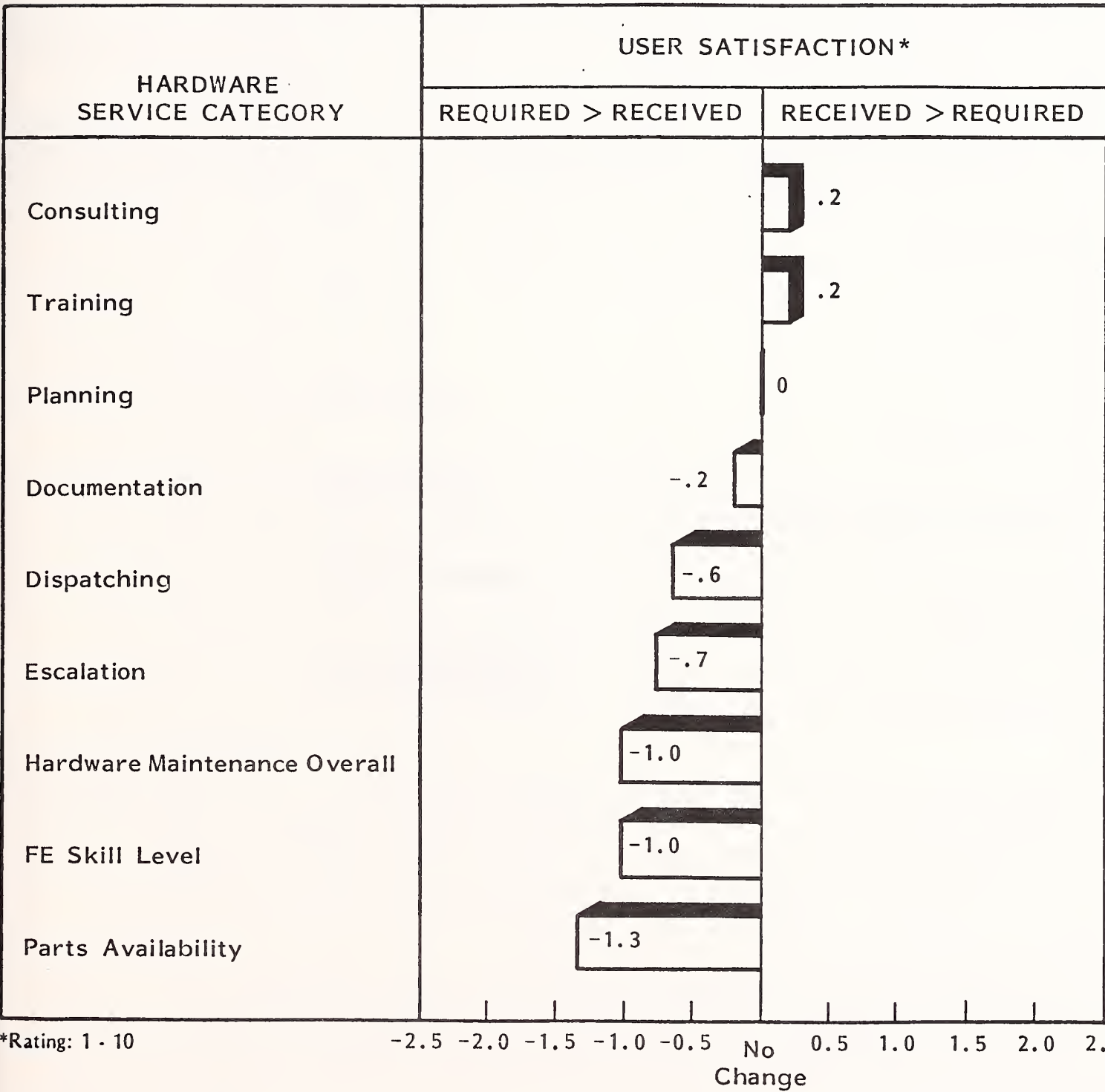
# EXHIBIT IV-5

## SERVICE PERFORMANCE AND USER RATINGS COMPARISON, 1984-1985: ALL SMALL SYSTEMS VENDORS



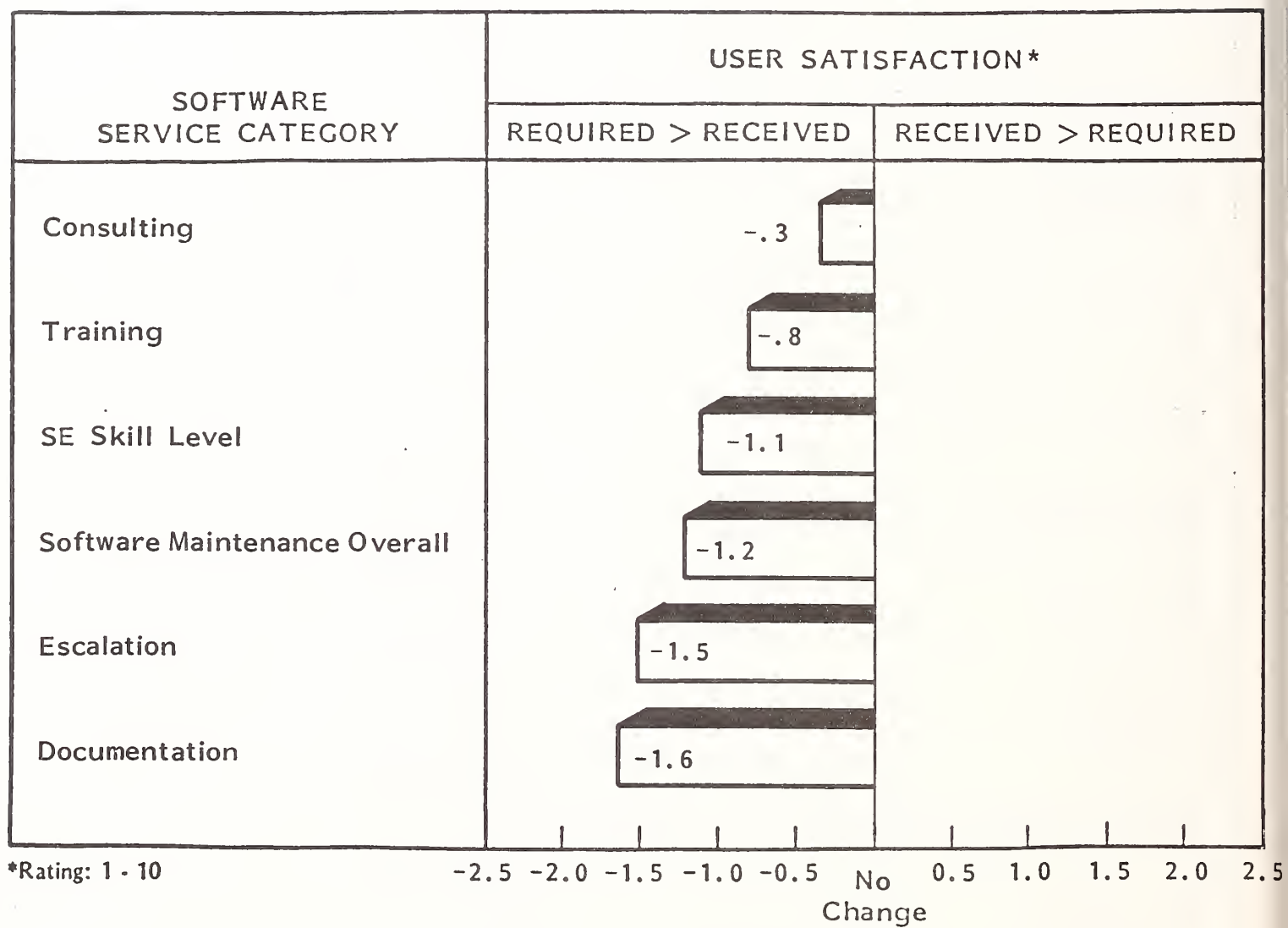
# EXHIBIT IV-6

## VENDOR HARDWARE SERVICE STRENGTHS AND WEAKNESSES: ALL SMALL SYSTEMS VENDORS



# EXHIBIT IV-7

## VENDOR SOFTWARE SERVICE STRENGTHS AND WEAKNESSES: ALL SMALL SYSTEMS VENDORS





- The current disparity between user requirements for service and vendors' actual performance suggests that vendors must focus on changing their performance levels or, more likely, users' perceptions of these levels. Vendors should attempt to increase user satisfaction using a two-prong strategy.
  - Make needed improvements in service delivery structure, including better recruiting and training of service personnel, improved spares management, and more effective problem escalation procedures.
  - Better educate the user base on service through existing service areas such as training and consulting. These service areas, often left to others as part of the sales function, are high-visibility, high-satisfaction services that improve user perception of the value of service received.

## 2. VENDOR RANKINGS

- A comparison of user satisfaction ratings by type of vendor (see Exhibit IV-8) shows that third-party maintenance providers have not been able to approach user requirements nearly as well as manufacturers. TPM vendors were rated lower on all categories. While the margin of difference was similar in each component, service price and response time stand out simply because these are two advantages that TPM vendors are generally able to offer. Apparently, the 25% of the sample that had used TPM vendors did not experience these "advantages."
- Users' rankings of satisfaction with the overall service of individual vendors is displayed in Exhibit IV-9 for vendors who were ranked above average and Exhibit IV-10 for vendors that were ranked below average.
- NCR achieved the highest overall user satisfaction rating, primarily as a result of vastly improved system availability and lower hardware response/repair time. IBM and Hewlett-Packard continue to deliver above-average service.

# EXHIBIT IV-8

## USER SATISFACTION BY TYPE OF SERVICE VENDOR

SERVICE COMPONENT	LEVEL OF SATISFACTION*	
	Manufacturer	Third-Party
Overall Service	8.1	7.7
Hardware Maintenance	8.3	7.9
Software Maintenance	7.3	6.8
Service Price	6.6	6.2
Response Time:		
Hardware	8.4	8.0
Software	7.3	6.8
Repair Time:		
Hardware	8.3	7.8
Software	7.1	6.5

Rating: 1 = Low, 10 = High

## EXHIBIT IV-9

### SMALL SYSTEMS USER SATISFACTION WITH OVERALL SERVICE - ABOVE-AVERAGE VENDORS

RANK	VENDOR	PERCENT RATING ABOVE INDUSTRY AVERAGE
1	NCR	+8%
2	IBM	+5
3 (equal)	Hewlett-Packard/ Burroughs	+4
5	DEC	=

# EXHIBIT IV-10

## SMALL SYSTEMS USER SATISFACTION WITH OVERALL SERVICE - BELOW-AVERAGE VENDORS

RANK	VENDOR	PERCENT RATING BELOW INDUSTRY AVERAGE
6 (equal)	Prime/ Data General	-1%
8	IV Phase	-4
9	Honeywell	-5
10	Datapoint	-6
11	Perkin-Elmer	-7

- IBM users rated hardware service particularly high, but were not totally satisfied with systems software support.
- Hewlett-Packard users are among the most satisfied with service, but higher user expectations for service lowered overall ratings.
- Burroughs improved its software support and professional services over the course of the year and the positive results are reflected in the significant improvement in user ratings. Burroughs does continue to have a problem, according to the users, with small systems parts availability and a (perceived) low skill level of field engineers.
- DEC users reported some gains in service satisfaction, particularly hardware maintenance. Ratings for professional services were also high, but lower ratings on software documentation and escalation procedures prevented the users' overall rating from reflecting these improvements.
- While Data General users' ratings showed improvements in systems availability, average number of interrupts, and total response time, these improvements could not offset dissatisfaction ratings on software support by over 60% of the users.
- Honeywell's satisfaction ratings improved in 1985 as the result of gains in hardware and software support and professional services.
- Datapoint user satisfaction declined because of problems with hardware support. Users reported a greater number of hardware interrupts in 1985 and an increase in the average repair time.
- AT&T (not shown) service was rated considerably below user expectations, but this is to be expected in the first year of commercial services operations. High-priority services include parts availability, support and training of engineers, and software documentation.



- To match increasing user expectations, vendors must implement strategies that allow for the cost-effective improvement in the delivery of high-priority maintenance while, at the same time, repositioning users' expectations overall by improving the perceived value of lower-priority services. Specific strategies are discussed in the next section.

V SMALL SYSTEMS SERVICE ISSUES



## V SMALL SYSTEMS SERVICE ISSUES

### A. SUBMARKET DIFFERENTIATION

- A major trend in the small systems service market is the growing differentiation among the low, middle, and high ends of the market (see Exhibit V-1). Differences in market maturity, user demands, and amount and type of competition call for different vendor strategies.
- The low end of the small systems market is characterized by rapid expansion of the installed base of hardware and growing competition between traditional minicomputer manufacturers and supermicrocomputer vendors. As indicated above, shipments are expected to continue at a fast pace through 1990 as manufacturers attempt to satisfy user hardware demands.
  - Manufacturers' concentration on meeting the new product demands of these users coupled with a notion that to speak of "service" suggest product fallibility has placed service primarily in the hands of VARs, resellers, TPM organizations, or the manufacturer's service center. In doing so, manufacturers have relinquished control over the quality of service and, in turn, user satisfaction.
  - This focus has resulted in a discrepancy between user satisfaction and vendor performance and has forced service vendors and manufacturers in particular to contend with an increasingly assertive user population

# EXHIBIT V-1

## SMALL SYSTEMS SUBMARKET DIFFERENTIATION

CHARACTERISTIC	SUBMARKET		
	LOW (Low Cost Distribution)	MIDDLE (Traditional 16-bit)	HIGH (Superminicomputers)
Installed Base	Growing	Large	Small
Expansion Rate	Very Fast	Slow	Fast
Service Provider	Manufacturing	TPM	Manufacturing
User Satisfaction	Low	Moderate	Moderate
Amount of Service Competition	Moderate	High	Low
Key Strategy	Price	Price/Quality	Status Quo



and a more competitive service market. In this sector users are particularly price sensitive. Certain vendors are susceptible to TPM encroachment because they can not or will not meet user requirements for such factors as rapid response/repair time at a competitive price.

- In the mid-sized submarket, the installed base is large and dense and users' demands for improved service have increased. As equipment sales have moderated, manufacturers have turned more attention to service. And, as user dependence on small systems availability has grown and their service price sensitivity declined, manufacturers have been able to achieve greater leverage (service revenue per equipment dollar) from service revenue.
  - Increased dependence on service revenues is a two-edged sword, however. On the one hand, vendors are somewhat less vulnerable to the market changes in equipment sales in that service seems to be relatively "recession proof." On the other hand, service can be a very labor-intensive function and is not as responsive to cost-cutting techniques as other areas such as manufacturing.
  - Much of the equipment sales in this traditional market are to VARs. VARs, however, do not generally service this equipment, calling on manufacturers or third-party maintenance vendors. To keep the established sales channels in place while improving the level of support, vendors must work with and complement the VARs. However, since vendors are more inclined to deal directly with users to identify problems and develop solutions, manufacturer-VAR relationships often become strained.
  - Vendors are attempting to impact the quality of service offered by placing additional demands on service providers in such areas as parts inventory and additional training on the manufacturer's product line.

- Vendors are also providing improved remote diagnostics and utilizing modular systems as two additional aids for improving response and repair time.
- TPM vendors will make gains in this submarket with high densities of machines (i.e., DG's NOVA and DEC's PDP). Besides a large installed base, these markets are attractive because parts are available from a variety of services and because the original manufacturers have raised service prices to induce hardware conversions.
- At the superminicomputer level, the installed base is smaller, but growing, and the number of competitors for both hardware and service is limited because of the complexity of both the hardware and software. User requirements are increasing, but the services alternatives are limited. TPM vendors, for example, will not do well in this market.
- One factor that will affect vendors' service revenue differently will be the breadth of small systems hardware needs.
  - DEC's VAX series, extending from superminicomputers to the micro level, is a good example of an extensive product line, and Wang's array of products is another. Data General also seems to have the potential for extending its line, but companies such as Burroughs, Honeywell, and Datapoint may not.
  - DEC's opportunities in this regard are particularly appealing in that compatibility within an entire line (VAX) is a strong selling point to users who expect expansion capabilities.

## **B. USER SERVICES REQUIREMENTS**

- The negative impacts of less-than-expected service performance are heightened in the small systems service market.
  - Users of low-end products are inclined toward self-maintenance, not so much to save service expenses but to meet requirements where service is not available from an external supplier.
  - The growing interdependence of data processing systems in the mid-range confronts users with the complication of which vendor to call for service. Users are attracted by the notion of a sole source of integrated service and support but find vendors unable (TPM vendors) or unwilling (manufacturers) to meet this need.
  - Because of the growing centralization of purchasing and the different availability requirements of users in nontraditional markets (e.g., office automation), the issue of service appears to have increased in level of importance. Centralization also provides corporations with purchasing power that demands quality service and quantity discounts.
  - With small systems providing processing power to a widening audience of end users, downtime is readily visible to these large bodies of end users who depend on constant access.

### **I. SELF-MAINTENANCE**

- One solution, somewhat reluctantly used by small systems users, is self-maintenance. Self-maintenance started as a reaction to the lack of or expense of quality small systems service as well as a means of satisfying the user's sense of involvement, but as internal expenditures have grown, vendors have become concerned that the user's practice of supporting small systems products internally will have a dramatic effect on service revenue.

- Low- and mid-range small systems users appear to be more willing to participate in maintenance operations than their counterparts at the superminicomputer level. In addition to the issue of necessity cited above, users participate more readily since products are generally less expensive and less complex, making users less wary of damaging their entire system. However, self-service on products which are critical to small systems is much less frequent.
- Support in a multi-vendor environment is also a catalyst for self-support as users are unable to find the environment-level planning, installation support, and education and training. As users develop expertise in these areas, their expectations for vendor-delivered service increase accordingly.
- While a certain level of in-house planning is to be expected in areas such as needs and capacity analysis and project implementation, small systems manufacturers are at a definite disadvantage if they have no impact until the end of the planning cycle.
- Software support is an area in which small systems users have been forced to develop their own internal support mechanism. This is particularly hard on many small systems vendors because the type of software support developed internally is the most profitable for software vendors. Users do not want to be involved in software maintenance that goes beyond limited technical skills such as installing patches.
- Education and training is a second potentially profitable software support area in which many users have become involved. Vendors are particularly concerned about loss of control in this area because it affects the end-user population over which capitalization and initial expenditures for education "products" can be distributed.



- A majority of vendors feel that the end user may play an important role in on-site small systems support. Also, self-maintenance offerings of manufacturers will likely reduce TPM penetration. Many vendors have programs to assist the user in providing service on their equipment. These programs include a support hotline, diagnostic initiation routines, and module swapping. If given the proper tools (data bases of software fixes, vendor-sponsored user groups) users do not object to some level of self-maintenance.
- INPUT expects continued user involvement in small systems support, particularly for low-end products. Vendors have been very active in designing alternative maintenance plans, such as mail-in/exchange programs, and subsidized spare parts plans for their products. Users have accepted these plans as the most cost-effective service delivery method for noncritical products, but require improved documentation if self-maintenance is to be effective.
- Exhibit V-2 depicts the level of users' willingness to participate in just one area of service, software support. Nearly 60% of the users surveyed expressed a high level of willingness (8-10 on a scale of 1-10). Key areas of participation include working with the remote support center to diagnose software problems and installing patches, modifications, and new releases.
- However, 55% of those willing to engage in self-maintenance also expect a service price discount. Although the expected discount varies by the type of participation, the average discount is 22% of basic service.

## 2. EXTENDED SERVICE

- On the other hand, some users require extended service and are willing to pay premiums to get it. Exhibit V-3 indicates both the percentage of users requiring various extended services and the percentage of users willing to pay various premiums.



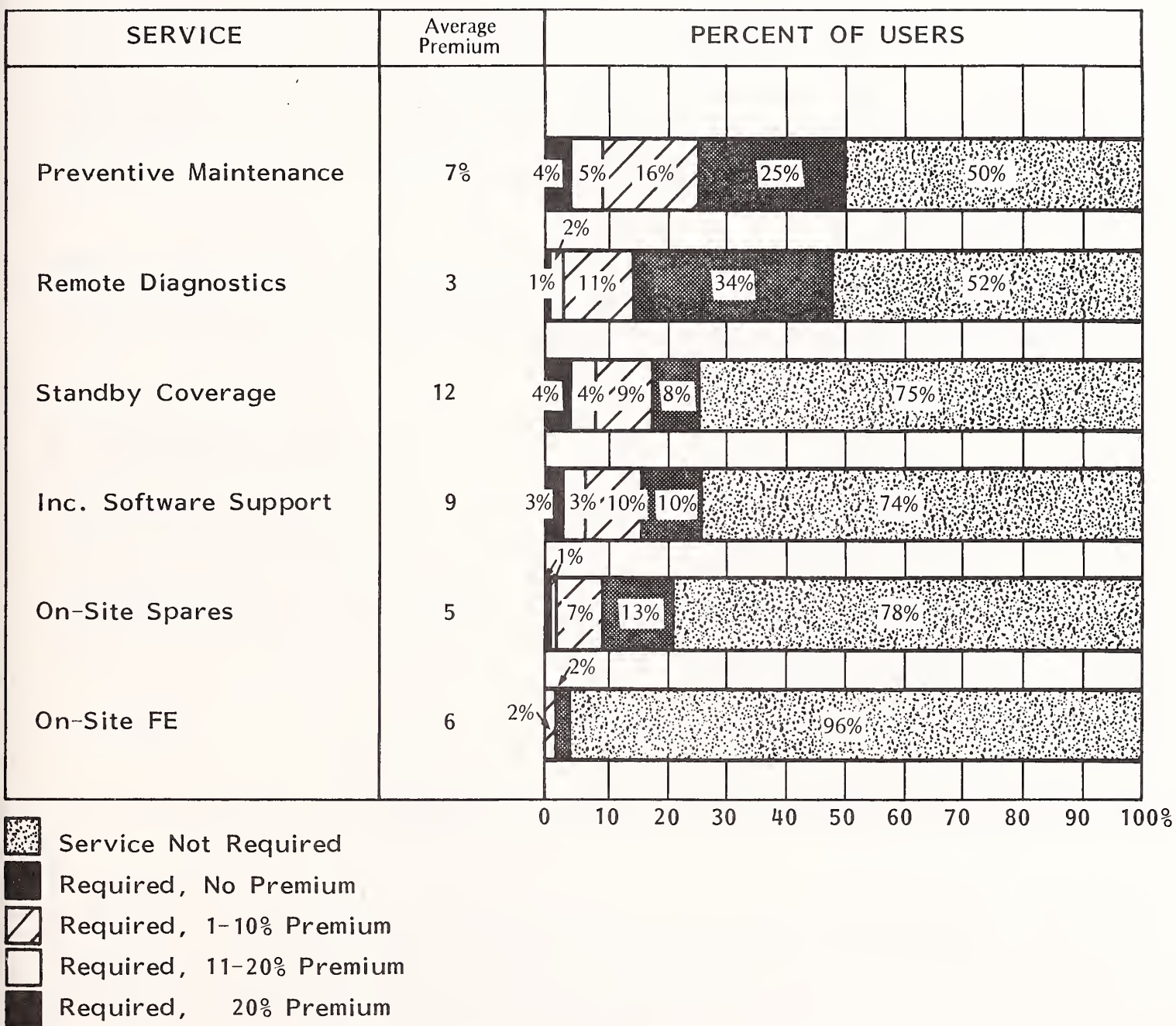
## EXHIBIT V-2

### USERS' ATTITUDES TOWARD INCREASED PARTICIPATION IN SOFTWARE SUPPORT

TYPE OF PARTICIPATION	WILLINGNESS (1 = Low, 10 = High)
Work with Support Center to Diagnose	7.3
Install Patches, Modifications	6.8
Install New Releases	7.0

# EXHIBIT V-3

## USER INTEREST IN EXTENDED SERVICE



- Preventive maintenance is clearly a service that many users require. While half of the users are not willing to pay for this extended requirement, the other half will pay an average of 7% over basic service. Four percent of these users will pay over 20% more.
- Remote diagnostics is the second most frequently required extended service (48% of the users want it) but, only 14% of those users are willing to pay for it. Overall, the average amount of premium is only 3%. Adding a remote diagnostics capability, then, would enhance user satisfaction but not vendor revenue.
- Standby coverage, while required by only 25% of the users, is clearly important to these users. A majority would willingly pay a premium, with the average acceptable premium 12%.
- Importance ratings and premium levels for these additional services do not dramatically differ according to the user's current maintenance vendor (see Exhibit V-4). What does differ is the number of additional users who require these services, particularly preventative maintenance and remote diagnostics, from their current TPM vendor. This suggests an area of needed improvement for TPM vendors and a competitive advantage for manufacturers who already provide these services.

### C. SERVICE PRICING AS A COMPETITIVE WEAPON

- While service price is not as important to users as reliability and response/repair times, users nevertheless have begun to view service more as a generalized commodity than as a specialized maintenance activity (see Exhibit V-5).
- As hardware becomes more reliable, users think of maintenance as a declining need and are reluctant to spend more dollars for fewer required services.

# EXHIBIT V-4

## USER INTEREST IN EXTENDED SERVICE BY TYPE OF VENDOR USED

EXTENDED SERVICE	TYPE OF VENDOR					
	MANUFACTURER			THIRD-PARTY		
	Percent Requiring	Rating of Importance*	Average Premium (Percent)	Percent Requiring	Rating of Importance*	Average Premium (Percent)
Preventative Maintenance	46%	7.7	5%	59%	7.6	8%
Remote Diagnostic	45	7.4	2	58	7.1	3
Standby Coverage	24	7.6	12	32	8.0	12
Increased Software Support	23	8.0	11	34	7.5	8
On-Site Spares	20	8.1	4	27	7.0	6
On-Site FE	5	7.6	10	2	4.5	6

\*Rating: 1 = Low, 10 = High

## **MAINTENANCE BECOMING A COMMODITY**

- **Sharp Increases in Reliability Encourage Users to Think of Maintenance as a Declining Need.**
- **Service as “Commodity” Means:**
  - **Brand Name Loyalty Decreases**
  - **Service Market Opens to Competition, That in Turn . . .**
  - **Causes Pressure on the Price of Maintenance**
- **Equipment Manufacturers/Service Vendors Must:**
  - **Distance Themselves from “Maintenance Only” Image**
  - **Develop the Image of a Total Service Company**
  - **Integrate all Post-Sale Services**



- When hardware does not need to be repaired, users see fewer on-site repairs and more component "swaps." And as the required skill level of the FE decreases, users typically see a reduced need to commit themselves to one particular vendor.
- Users also become concerned that service prices are increasing without a corresponding increase in quantity and quality of service.
- Users expect, but do not receive, discounts for self-maintenance.
- Some vendors, particularly TPM vendors, fuel this new view of price as they aggressively promote comparisons based on cost-effective services rather than the "brand name" reputation of the service vendor. This competition will force some vendors into a downward spiral of price cutting in the hardware service sector. But, the small systems life cycle is typically not as long as for mainframes, so TPM vendors have a shorter time to train engineers, establish logistics operations, and, most importantly, seek price-insensitive users whose needs are not being met by the manufacturers.
- With a history of service price increases as a base of planning, many vendors have failed to reduce service costs as service prices have fallen. These vendors may have, mistakenly, thought that lower prices were only temporary.
- Price reductions have resulted both from technical advances that resulted in lower costs and from a more sophisticated and analytic user base that demanded competitive prices in line with the quality of service required and received. These falling prices generally are not temporary, forcing vendors to explore other service strategies in search of profits.
- The need to hold down service costs and maintain high levels of service profitability (along with the continuing need to improve systems reliability) has become the prime motivation behind the development of improved service technology (see Exhibit V-6).

## EXHIBIT V-6

### IMPACT OF TECHNOLOGY ON HARDWARE SERVICE

- Improved reliability based on:
  - Redundant system
  - Modular design
  - Better diagnostics
- Shorter product life cycle requires:
  - More efficient logistics operations
  - Improved FE training
- Reduced on-site support results from:
  - Increased "parts-swapping"
  - Remote support
- User expectations for hardware service are changing:
  - Perception is that hardware should be available 100% of the time
  - Increased reliability should lead to lower prices

- As systems become more reliable, there is increased pressure from both users and competitive vendors to keep maintenance prices down. Successful service vendors are forced to use new technology in order to keep costs down and remain competitive.
- These technical changes are designed to improve uptime and serviceability of equipment while reducing the cost of providing service.
- Changes that rely on technology to improve service include:
  - Redundant and fault-tolerant systems that include resident self-diagnostics and that require less FE skill and more modular component exchange repair, reducing the number of on-site calls and permitting the scheduling of service and the allocation of resources.
  - Remote support (both vendor-proprietary and multi-vendor) that facilitates remote diagnostics, reduces callbacks, and allows better management of parts inventory.
  - Modularity of systems that permit component swapping by the user or a less-skilled FE, reducing on-site service expense.
- Although the costs of delivering service are increasing, vendors are faced with some price resistance from already dissatisfied users and a body of competitors working to turn lower prices to their advantage. As one strategy to achieve profitability vendors must turn to service cost control.
  - Vendors are increasing service revenue despite lower prices and slower equipment sales because they have become more efficient in delivering service. Greater use of remote support and telemarketing is reducing on-site service and sales calls, the most costly component of service. Exhibit V-7 depicts the frequency of several alternate delivery modes

# EXHIBIT V-7

## USE AND SATISFACTION LEVELS OF SUPPORT DELIVERY MODES

DELIVERY MODE	PERCENT USING	SATISFACTION LEVEL*
Remote (National Center)	46%	7.2
Remote (Regional Center)	35	7.6
Mail	23	7.4
On-Site Software Engineer	18	7.8
On-Site Hardware Engineer	12	8.1

\*Rating: 1 = Low, 10 = High

and user satisfaction with each. National-level remote support is the most frequently used mode, followed by regional-level remote support and mail-in. Compared to the satisfaction levels discussed earlier, these users are not very pleased with vendor performance in providing these services.

- Vendors are protecting service revenue from their installed base through competition on price with TPM vendors by offering manufacturer-developed remote diagnostics and support routines not available to TPMs and by promoting integrated, single service which TPMs generally cannot offer.
- While technical advances were introduced primarily to lower the cost of service and increase profitability, competition based on service price is forcing vendors to utilize the cost savings to reduce prices, rather than increase profitability.
- Although users are resisting hardware service price increases, there seems to be little resistance to increases, even premiums, for improved support in other ones. One key to improved service, particularly in the areas of parts supply and logistics and post-sale support (parts and supplies sales, consulting, training, etc.) is centralization.
  - It affords the much more efficient "just in time" inventory procedure.
  - It facilitates a more coordinated and faster dispatching effort.
- A majority of small systems vendors now offer some form of remote support services (RSS). This is one of the most successful applications of centralized support technology in that it provides:
  - Enhanced ability to improve response time by initiating diagnostics at the time of the initial problem call.



- Improved repair time, especially when "fixes" are made from remote locations without involving an on-site FE.
  - Reduced no-fault calls, callbacks, and on-site calls in general, resulting in a more efficient application of the FE's time.
  - Reduction in the level of skill required of the FE since the FE is more easily supported by experts at remote support centers.
  - Increased protection from TPM vendors who have neither the access to the proprietary software used in the diagnostic/repair process nor the R&D capital to develop an RSS capability.
- The disadvantages of remote support, while they do not offset the economic and performance advantages, must also be noted.
    - Since an on-site FE is sometimes regarded as a measure of prestige or a "natural" part of service, some clients resist the reduction in customer contact and "hand holding."
    - Users are concerned that the security of their system could be violated by unauthorized remote access.
    - Users want to understand at least the problem determination process and feel excluded from the interaction diagnostics between the expert and the system.
    - Users may not understand the diagnostic process and attempt to conceal their ignorance by not supporting remote support. These users will first need to understand its benefits.

- Service on fault-tolerant systems, because it employs the resident self-diagnostic capabilities resulting from the redundant component technology, usually requires less FE skill and more component exchanges. Reliable, fault-tolerant, and redundant technology will decrease unscheduled CPU maintenance through the use of multiprocessor tasking. Most repairs will be made during regularly scheduled maintenance. This, in turn, will permit the efficient allocation of service resources.
- System modularization is attractive to manufacturers because it offers compatibility of peripherals. DEC, for example, has ensured peripheral compatibility for its VAX and PDP series and in the process attracted many users.
- Modularization also reduces service costs as the self-diagnosing components are easily replaced by relatively unskilled technicians or the users themselves.
- Another area affected by service technology is dispatching. While many vendors seem to show initial dissatisfaction with a "hotline" and central or regional dispatch centers, they begin to appreciate the efficiencies after a short time. Vendors should take a more active role in demonstrating the advantages of centralized dispatching for, in the long run, it will be a necessary part of an efficient operation.
- The final factor increasing vendor dependence on service technology will be user requirements for flexibility. There is a growing indication that at the low end of the market, users want to be more involved in alternative forms of maintenance. This would include depot maintenance, some user-initiated repairs, and some user-initiated diagnostics.
- As a consequence of this user pressure, vendors are significantly changing the design of the equipment. More and more, vendors are taking service into consideration at the equipment design stage so that parts are modular, easily diagnosed, and easily replaced. This conforms to user requirements for

service flexibility (i.e., the user can perform some maintenance) and it also reduces the vendor's labor costs (FEs spend less time on-site because they can now replace rather than repair individual modules). While technical advances provide the less painful route to service price reductions, vendors must also address the need to remain price competitive in the segment of older machines. Lower prices in this segment are a two-edged sword—they fight TPM penetration and contribute to user satisfaction—but artificially low prices may mean unacceptable levels of profitability and may eliminate an impetus of new equipment purchases.

- The basis of service pricing should reflect the characteristics of the market sector. Where the competition is greatest, prices should be based on quality and user needs. Where competition is less intense, price can be based on a percentage of the hardware purchase price.
  - In some sectors (office automation), users favor fully integrated support over improved performance on individual services. In other sectors (technical/scientific), users require less support.
  - With service options broadening, users are asserting themselves and demanding increased vendor flexibility against the threat that they will take their business (hardware and service buys) elsewhere.
- Vendors can also increase service flexibility by unbundling services and developing and promoting self-support.

#### D. FULL SERVICE VERSUS SERVICE UNBUNDLING

- Vendors are increasing service revenue by offering greater flexibility in the number and type of services. Users subscribe to these new services that satisfy previously unmet needs.

- In order to withstand the pressures to lower service pricing (resulting from maintenance becoming a commodity), vendors move to distance themselves from a "maintenance only" image. Service vendors begin to integrate all post-sale services into one department (particularly the customer services department) in order to develop an image of a total service company.
  - The primary advantage of offering a total package is that it allows the vendor to understand the user's needs and "control" the user's site. However, it is also important to note that the total service vendor will retain name and service product loyalty among users, while strictly hardware maintenance vendors will be forced to do business in an increasingly price-competitive market.
  - This strategy also reinforces vendors' ability to exclude TPM competition by controlling parts supply, software source code, technician training, etc.
- In addition to site control, a total-support package can contribute to overall service profitability. Even though users are becoming more resistant to hardware service price increases, there is little evidence that this trend is being carried over to other post-sale support areas. In fact, users may be willing to pay premiums for improved post-sales support services like software support.
- Professional services help to differentiate full-service vendors from hardware-only vendors (see Exhibit V-8). By giving up the price-sensitive, hardware-only low end of the market, vendors will be in a better position to attract users who value the full array of services. Professional services such as capacity management, planning, and systems design provide the advantage of knowing what new equipment a user requires and could prove instrumental in increasing hardware sales. This latter benefit, rather than actual service revenue, could be a big contributor to a company's profitability.

## EXHIBIT V-8

### UNBUNDLING PROFESSIONAL SERVICES

- Large systems vendors are unbundling professional services in order to:
  - Remain price competitive on basic hardware/software service
  - Improve user perception of service flexibility
  - Accurately assess costs and increase profitability of professional services
  
- Professional services typically unbundled include:
  - Consulting
  - Planning
  - Installation (particularly for low-end systems)
  - Site management



- A critical issue of full service is the vendor's policy with respect to servicing "foreign" equipment that exists in multi-vendor sites. Vendors must decide if they will:
  - Ignore foreign equipment.
  - Diagnose but not repair this equipment.
  - Repair or have repaired defective foreign equipment.
- Unbundling allows the manufacturer to offer competitive "basic" service prices, while at the same time promoting the advantages of full support to those users who desire it.
- One target for unbundling is systems software service. While the complexity of systems software adds a burden to service, this burden may more than adequately be covered by users' willingness to pay substantial premiums for quality software support.
  - Manufacturers have little to lose by unbundling in that a complex operating system ties the user to the vendor, perhaps even more than the hardware does.
  - Users will support price increases for software support because its complexity prohibits users or independent vendors from providing the level of support required. Systems software is being combined with data base management systems that only manufacturers or software vendors can support.
- Small systems users are not homogenous, so vendors must identify user segments to target service programs accordingly.

- User groups must be segmented to identify acceptable pricing. Some users will accept a lower level of service (e.g., depot versus on-site) for a discount.
- Some users require a higher level of service and are willing to pay premiums for it.
- The majority of users generally accept current prices, but demand better service in some areas while accepting below-average service in others.

## **VI CONCLUSIONS AND STRATEGIC RECOMMENDATIONS**



## VI CONCLUSIONS AND STRATEGIC RECOMMENDATIONS

### A. STRUCTURE OF THE CHANGING MARKET

- The small systems service market is changing rapidly as a result of user pressures and increased vendor competition. Small systems service vendors will need to address these changes to remain profitable.
- Exhibit VI-1 lists several of the factors affecting the structure of small systems service.
  - Differing growth rates in hardware shipments within submarkets for small systems has resulted in user segments that are dramatically different from one another with respect to service requirements. But regardless of the submarket, the overall level service being provided is less than what users require, creating a level of dissatisfaction with current service vendors.
  - In response to this dissatisfaction, and as a means of bolstering corporate revenue that will decline as a result of moderating demand for hardware, manufacturers are seeking greater control of the service market.
  - While there will continue to be opportunities for dealers/distributors as "convenience" vendors and TPM vendors as "budget" vendors, manufac-



## EXHIBIT VI-1

### STRUCTURE OF THE SMALL SYSTEMS MARKET

- Submarkets Are Becoming Differentiated
- Dissatisfaction With Service Is Increasing
- Importance of Service Revenue Is Increasing
- Repackaging of Service Options Required

turers should realize the larger opportunities by offering "single-source full service." By differentiating themselves from "hardware-only" vendors and by unbundling services so users have a menu of service options, manufacturers will establish control over the user site and gain a greater understanding of user needs.

- A key to the small systems market will be the ability to identify user segments and exploit their potential. User group differences include size of machine, satisfaction level, amount of service competition, price sensitivity, and requirements for flexible service product packaging (see Exhibit VI-2).
- The market share controlled by non-manufacturing vendors will depend on their ability to identify and enter market niches while responding to increased competitiveness from overall leaders and market niche leaders.
  - These vendors should watch for and be prepared to respond to price reductions by major vendors attempting to hold customers and make it difficult for TPM vendors to compete. In these instances, to be competitive, vendors must initiate service cost reductions, primarily by reducing labor-intensive, on-site expenses, but also by unbundling services so that users are able to choose from a menu of services that are priced to be competitive for typical services and command a premium for extraordinary services.
  - A focus on user requirements means that vendors must adapt to changing user demands and, at the same time, improve basic services such as hardware availability. As demonstrated in Exhibit VI-3, vendors must concentrate on software support, systems integration services, and education and training.

## EXHIBIT VI-2

### PROACTIVE MARKETING OF SERVICE

- Knowledge of User Needs Should Drive Service
  - Identify and Enter Niches
  - Package/Price Service Carefully
- Respond to Competitive Pricing
  - Market Vendor's Own Service Quality, Options, and Advantages
  - Reduce Service Costs
  - Unbundle and Reprice Service

## **SMALL SYSTEMS USER REQUIREMENTS**

**In 1985 . . . . .**

- **Single-Source Maintenance of Mixed Vendor Hardware is Mandatory**
- **Service Flexibility Results from Unbundled Service Products**
- **Service Must be Price Competitive**



**By 1990 . . . . .**

- **Systems Integration Leads to Consolidation of Post-Sales Support**
- **Reprioritize Support Services**
  - **Software Support**
  - **Planning/Consulting**
  - **Improved Self-Support Options**

## B. DEALING WITH HIGH USER EXPECTATIONS

- The escalating importance of small systems availability and the resulting shortfall of vendor performance compared to user requirements is unlikely to change through the end of the decade.
- It is unreasonable to think that vendors will be able to devise a single strategy for addressing user satisfaction directly. To do so would increase the cost of services beyond the users' threshold of sensitivity. Rather than trying to keep up with these ever-increasing user expectations, vendors should target the users' "perceptions" of service. Detailed knowledge of user needs should drive services to achieve market segmentation, repackaging of services, positioning of services, and competitive prices (see Exhibit VI-4).
- While it is difficult to categorize users, some services are much more influential on satisfaction levels than others. These influential services include response/repair time, hardware/software maintenance, FE skill level, and parts availability.
- Improvements in these services usually result in an improved level of user satisfaction. Improvements in other, less important services will have less of an impact. As the service vendor improves a service, that service becomes more important to the user and exerts a greater influence on the user's overall level of satisfaction. This action/reaction is as true for low-cost, low-priority service areas as it is for high-priority services such as response/repair time.
- INPUT believes that by emphasizing improvements in low-priority areas, such as planning and consulting, vendors will experience some improvement in user satisfaction. Some low-priority areas to target include consulting, documentation, training, network planning, and escalation procedures. Vendors must be careful, however, to avoid the creation of additional user dissatisfaction caused by the prioritization of service resources.



## EXHIBIT VI-4

### DEALING WITH INCREASED USER EXPECTATIONS FOR SERVICE

- Unbundle services not required by the average user.
- Temper user expectations for service by offering premium level support--at a premium price.
- Increase the perception of the importance of support services; e.g., documentation, remote support, consulting.
- Lower expectations of high-priority services by emphasizing alternative services.

- Concurrent with this, vendors should show flexibility in the number, type, and price of services offered. These additional services should be designed to meet user needs rather than the service organization's capabilities.
  - One such strategy is to accommodate user requirements for a single access point for all post-sales support services. This type of support organization will not only improve user satisfaction, but will also increase service revenues and profitability. Components of full service include:
    - Presale: prospect visits, proposal assistance, environment planning, installation planning.
    - Post-sale: training, software support, documentation, contracts management, hardware and software maintenance, add-on sales, ongoing analyses of requirements.
- In addition, by developing an image of a total support vendor, manufacturers will be able to distinguish themselves from the highly competitive, hardware-only service vendors. Forceful marketing of vendors' own service quality, options, and advantages is required, however.
  - Vendors must concentrate on improving the quality of service in conformance with user requirements, discharging those services that do not contribute to satisfying user needs.
  - Growth in service options can lead to confusion unless services are packaged well. And with these packages, flexible pricing must be employed--offering discounts for reduced services and requiring premiums on higher levels of service.

## C. SERVICE MODE OPPORTUNITIES

- Throughout the forecast period small systems service will be hardware-oriented. Not only is this the most visible area of service, it is also the most price sensitive. As applications of small systems increase, users become less price sensitive, opting for the quality of service generally available from manufacturers. As service competition grows, however, a commodity notion of service will prevail, providing opportunities for competitive pricing by TPM vendors and full service strategies by manufacturers.
- Hardware maintenance is an area in which users expect substantial improvements in the future. Exhibit VI-5 lists what INPUT believes are the most important components of a successful adjustment in hardware maintenance. Essentially, the exhibit emphasizes that vendors must become more efficient in delivering hardware maintenance (i.e., cut down on on-site repairs, increase inventory turnover, etc.) while at the same time become more flexible in meeting user needs.
  - Low-demand services (e.g., annual site audits) should be unbundled from the basic service contract so that only those users who require the service will pay for it.
  - Lack of parts prolongs repair time, causing repeat visits and loss of good will. Vendors must develop systems for making parts available without holding high inventories that tie up capital. One system is to use a computer-based optimizing inventory system to improve the hit rate.
- Currently, a pressing user demand for service improvements is in the area of software support. INPUT recommends that vendors take an aggressive stance on supporting software. As shown in Exhibit VI-6, one of the first steps in improving software support is to integrate software maintenance into the

## EXHIBIT VI-5

### HARDWARE MAINTENANCE FOCUS ON EFFICIENCY AND FLEXIBILITY

- Centralize Operations
- Increase Remote Support
- Manage Spare Parts Inventory
- Unbundle Low-Demand Services
- Expand Service Offerings

## EXHIBIT VI-6

### SOFTWARE SUPPORT - VENDORS MUST IMPROVE SERVICE

- Integration of Software Maintenance into Customer Support Program
- Increased Remote Support
- Greater User Involvement in Software Maintenance
- Development of Software Data Bases for Access by Users
- Combine Systems and Applications Software Support into One Department; Increase Support for Applications Software
- Consolidation of Software Support into National Service Centers



Customer Support Program. Cross-training hardware and software engineers should not replace specialization, which is the key to profitable service. However, it is important that users perceive that they have a single source of report.

- Although cross-training is not necessary, hardware and software engineers must work together effectively so that users feel that they have one central support group solving problems. Users that suffer from finger-pointing between hardware and software support departments have, on average, the lowest satisfaction rate of all customers interviewed. Conversely, vendors who have successfully integrated hardware and software support have the highest user ratings in the industry.
- A consolidated software support center--as opposed to regional centers--is recommended because of the efficiencies inherent in one central location. Vendors can provide a variety of different services economically from one location that they may not be able to offer if regional centers were used. For example, one small system vendor maintains a central support center in the same building with the company's software R&D staff. Even the most minor software support problems can have a rapid turnaround time when the original programmer is available.
- Vendors have often neglected another important software support resource--the end user. INPUT has found that many users will not object to becoming involved in their own software support if they are given the proper support. User-accessible tools, such as data bases of software fixes or vendor sponsorship of user group meetings, can be very effective in both reducing software support calls and improving user satisfaction with service. Not all users will be interested in this option, but if the vendor segments the user base properly, substantial opportunities will come from encouraging some self-maintenance of systems software.

- Although vendors are making substantial improvements in software support, user requirements are increasing at an even more rapid rate and are expected to increase steadily throughout the forecast period. As a result of the continuing demand for software services and support, INPUT expects steadily increasing prices without user resistance. In fact, users will most likely be willing to pay higher support fees for improved service in such areas as documentation, engineer training, and increased diagnostics and remote support.
  
- The unbundling of professional services such as planning and consulting has benefited vendors who have done so. With the increase in systems integration, user demand for planning and implementation support has been particularly strong. While in many cases there is a need for vendors to offer either hardware products or professional services, vendors should position themselves to sell. By providing independent consultation, vendors can influence customers' purchasing decisions. Care must be taken, however, to ensure the customer feels that the vendor is offering the best advice, free of "hidden agendas" and strings back to the vendor's products.
  
- Education and training is one of the fastest growing service segments in the industry. INPUT believes that this growth will continue through the remainder of the decade and that it represents a substantial opportunity for vendors.
  - The increasing user demand for service is also based on the growing penetration of computerization in most industries. As more and more companies provide small systems functions, they are looking to the vendor to train their employees in the effective use of these system capabilities.
  
  - An additional advantage to the growing user demand for education and training is the effect these services have on user satisfaction rates. Vendors who have initiated training programs have improved user

satisfaction with service considerably. This, in turn, promotes an even greater demand for training.

- The increasing margin derived from education and training will result primarily from more efficient techniques and delivery modes.
  - Live instruction, currently the most common training method, is limited in profit potential due to the inherent costs of on-site instruction. Further, users are objecting to the travel costs and work time lost through training at remote sites.
  - Video-based instruction is growing, but will represent a small portion of the market by 1990.
  - Video-based instruction can be an excellent method of providing a quick overview of a subject; however, detailed instruction is frequently unsuccessful because of the lack of interactive testing capabilities. In addition, the high cost of revising video production makes it difficult to adapt a video training program on one subject to any other subject area.
  - Computer-aided instruction/computer-based training (CAI/CBT) is growing and represents the major opportunity in this market. CAI/CBT, while costly to develop initially, is relatively inexpensive to upgrade.
- While hardware servicing will continue to dominate as a revenue source, other services are coming into their own and offer not only faster growth prospects, but also higher levels of user satisfaction.

## **APPENDIX A: VENDOR QUESTIONNAIRE**





APPENDIX A  
VENDOR QUESTIONNAIRE

Manufacturer Name:

Address:

City:

State, Zip:

Interviewer:

Date:

RESPONDENT

TITLE

1.

2.

3.

4.

5.

6.

1. Demographics

A. Total Number of Field Service Employees

B. Number of Engineers (FE and SE)

C. Number and Location of Parts Depots

D. How many service locations in the U.S.

2. Background Information

3. A. Total Company Revenue
  - B. Total Service Revenue
  - C. Service Revenue Growth Rate
  - D. How Long Have You Been a Profit Center?
- 
4. A. Do you service systems and applications software from the same location (where)?
  - B. How is software support typically delivered? (1 = Never, 10 = Always)
    1. Remote Diagnostics \_\_\_\_\_
    2. Down-Line Load (Remote Fix) \_\_\_\_\_
    3. On-Site Hardware Engineer \_\_\_\_\_
    4. On-Site Software Engineer \_\_\_\_\_
    5. Mail \_\_\_\_\_
    6. Other \_\_\_\_\_
    7. Software Installed by FE is Charged T&M Rate \_\_\_\_\_
    8. Toll-Free Numbers (PC) \_\_\_\_\_
  - C. Are users encouraged to become involved in software support?
    1. Install Patches, New Releases \_\_\_\_\_
    2. Access Solutions Data Base \_\_\_\_\_
    3. Direct Access to Software Engineer \_\_\_\_\_
    4. Purchase of Source Code \_\_\_\_\_
    5. Some Software is User-Installable \_\_\_\_\_

5. Does your department have responsibility for the following customer service functions? (If yes, for how long)

<u>FUNCTION</u>	<u>CONTROL (Y/N)</u>	<u>WHEN</u>
A. Planning (Revenue/Profit)		
B. Marketing		
C. Sales Support		
D. End-User Documentation		
E. Pricing		
F. Discounts		

6. Where do these service functions fit into your organization?

- A. Dispatching
- B. Logistics/Parts Supply
- C. Depots
- D. Refurbishment Centers
- E. Software Support
  - 1. Applications
  - 2. Systems
- F. Professional Services
  - 1. Consulting
  - 2. Planning
  - 3. Etc.
- G. Sales of Supplies

7. Could I have a copy of your service department organization chart?



8. Which of the following services offer your company the best opportunity for growth (as a percent of total service revenue)?

<u>SERVICE/MARKET</u>	<u>PERCENT GROWTH EXPECTED</u>
A. Third-Party Maintenance	
B. Education/Training	
C. Professional Services	
1. Consulting	
2. Planning	
3. Custom Programming	
4. Site Audits	
5. Sales of Supplies	
D. Hardware Maintenance	
1. Installation/Deinstallation	
2. Extended Services	
3. Unbundling Basic Services	
4. User Self-Support	
E. Software Support	
1. On-Site	
2. Remote	
3. Problem Data Bases	
4. Self-Support	
5. Applications Software	
6. Systems Software	
7. Unbundled Contracts	

10. A. What do you see as the major service-related problem area your company must face right now?

B. In the next 2-3 years?



## **APPENDIX B: USER QUESTIONNAIRE**





APPENDIX B  
USER QUESTIONNAIRE

CATALOG NO. F M A 1

DEMOGRAPHICS

1. CPU Manufacturer \_\_\_\_\_
2. CPU Model \_\_\_\_\_
3. CPU Installed Age (Years, e.g. 4.5 Years) \_\_\_\_\_
4. Current Maintenance Coverage on CPU (e.g. BMMC, T&M, 24 X 7)  
\_\_\_\_\_
5. Length of Service Relationship With Current Vendor (Years; e.g. 3.9) \_\_\_\_\_
6. Distance from Service Outlet to User's Site (Miles) \_\_\_\_\_
7. On a scale of 1 to 10, where 1 = low and 10 = high, please rate your service vendor in the following categories:
  - a. Overall satisfaction with service \_\_\_\_\_
  - b. Satisfaction with hardware service \_\_\_\_\_
  - c. Satisfaction with systems software service \_\_\_\_\_
  - d. Price of service \_\_\_\_\_
8. If your company were to purchase a computer today, how important would each of these features be (1 to 10) in the purchase decision process:
  - a. System price \_\_\_\_\_
  - b. System capabilities \_\_\_\_\_
  - c. Reliability \_\_\_\_\_
  - d. Maintenance response time \_\_\_\_\_
  - e. Maintenance repair time \_\_\_\_\_
  - f. Price of maintenance \_\_\_\_\_
  - g. Vendor reputation for maintenance \_\_\_\_\_

9. How many hours a week is your system typically used? \_\_\_\_\_
10. What percent uptime (on average over the past 6 months) are you currently experiencing?  
\_\_\_\_\_ %
11. How many system interruptions do you have each month? \_\_\_\_\_
- a. What percent of system interruptions are hardware related? \_\_\_\_\_ %
- b. Software related? \_\_\_\_\_ %

## SOFTWARE

- 12a. How are you currently receiving systems software support?
- b. (If yes on "a."), how satisfied are you, on a scale of 1 to 10, with the different methods of software support?
- |  | a.<br>(Yes/No) | b.<br>(1 to 10) |
|--|----------------|-----------------|
| 1. On-site hardware engineer                       | _____          | _____           |
| 2. On-site software engineer                       | _____          | _____           |
| 3. Remote from centralized national support center | _____          | _____           |
| 4. Remote from regional support center             | _____          | _____           |
| 5. Other. _____                                    | _____          | _____           |
13. On average, how many hours does it take your vendor to respond to a systems software problem?  
\_\_\_\_\_
14. And how many hours to resolve systems software problems?  
\_\_\_\_\_
15. How satisfied (on a scale of 1 to 10) are you with:
- a. Systems software response time \_\_\_\_\_
- b. Systems software repair time \_\_\_\_\_

16a. Would you be willing to participate in systems software support maintenance by any of the following methods?

b. (If yes in "a"), what would you consider a reasonable discount (of BMMC) for receiving systems software support by these methods?

	a. <u>Yes/No</u>	b. <u>Percent Discount</u>
1. Working with a support center to diagnose problem	_____	_____ %
2. Installing patches or modifications	_____	_____ %
3. Installing new releases	_____	_____ %

17a. Please rate on a scale of 1 to 10 your requirements for the following systems software goods and services:

b. Please rate on a scale of 1 to 10, your current level of satisfaction with the systems software goods and services you receive from your vendor:

<u>Vendor Goods and Services</u>	<u>Requirement</u>	<u>Current Level</u>
1. Software documentation	_____	_____
2. Software training	_____	_____
3. Software engineer skill level	_____	_____
4. Software consulting	_____	_____
5. Software escalation	_____	_____
6. Software maintenance	_____	_____

## HARDWARE

18. How many hours does it take your vendor to respond (on-site) once you have placed the first call?

\_\_\_\_\_

19. How many hours does it take the vendor to repair the equipment once the FE is on-site?

\_\_\_\_\_

20. Again, on a scale of 1 to 10, how satisfied are you with:

- a. System availability \_\_\_\_\_
- b. Hardware response time \_\_\_\_\_
- c. Hardware repair time \_\_\_\_\_

- 21a. Please rate, on a scale of 1 to 10, your requirements for the following hardware goods and services:

- b. Please rate your current level of satisfaction with the services you receive from your hardware maintenance vendor:

<u>Vendor Goods and Services</u>	<u>Requirement</u>	<u>Current Level</u>
1. Hardware capacity planning	_____	_____
2. Hardware consulting	_____	_____
3. Hardware documentation	_____	_____
4. Hardware training	_____	_____
5. Parts availability	_____	_____
6. Dispatching	_____	_____
7. Escalation	_____	_____
8. Hardware maintenance	_____	_____
9. FE skill level	_____	_____

### THIRD-PARTY MAINTENANCE

22. Do you currently use third-party maintenance on any of your DP equipment?

☐ Yes ☐ No

23. (If no), have you considered using TPM? ☐ Yes ☐ No

24. (If yes on 22), for what product(s) are you using third-party maintenance?

25. On a scale of 1 to 10, how satisfied are you with the TPM service you are now receiving (if yes on 22)?

\_\_\_\_\_

#### PRICING

- 26a. Do you have a requirement for any of the following services?
- b. On a scale of 1 to 10, how important is your requirement for the service?
- c. What would you consider a reasonable premium for these services (over and above your BMMC)?

<u>Service</u>	<u>a.</u> <u>Yes/No</u>	<u>b.</u> <u>1 to 10</u>	<u>c.</u> <u>Percent</u>
1. Standby coverage	_____	_____	_____ %
2. On-site spare parts	_____	_____	_____ %
3. Remote diagnostics	_____	_____	_____ %
4. PM (preventive maintenance) during non-prime hours	_____	_____	_____ %
5. Full-time on-site engineer	_____	_____	_____ %
6. Increased software support	_____	_____	_____ %

Thank You.





## APPENDIX C: DEFINITIONS



## APPENDIX C:        DEFINITIONS

- APPLICATIONS SOFTWARE - Software that performs processing to service user functions.
- CONSULTING - Includes analysis of user requirements and the development of a specific action plan to meet user service and support needs.
- DISPATCHING - The process of allocating service resources to solve a support-related problem.
- DOCUMENTATION - All manuals, newsletters, and text designed to serve as reference material for the ongoing operation or repair of hardware or software.
- END USER - May buy a system from the hardware supplier(s) and do own programming, interfacing, and installation. Alternatively, may buy a turnkey system from a systems house or hardware integrator.
- ENGINEERING CHANGE NOTICE (ECN) - Product changes to improve the product after it has been released to production.
- ENGINEERING CHANGE ORDER (ECO) - The follow-up to ECNs which include parts and a bill of material to effect the change in hardware.

- ESCALATION - The process of increasing the level of support when and if the field engineer cannot correct a hardware or software problem within a prescribed amount of time, usually two to four hours for hardware.
- FIELD ENGINEER (FE) - For the purpose of this study, field engineer, customer engineer, serviceperson, and maintenance person were used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.
- HARDWARE INTEGRATOR - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. May also develop control system software in addition to installing the entire system at the end user's site.
- LARGE SYSTEM - Refers to traditional mainframes including at the low end IBM 4300-like machines and at the high end IBM 308X-like machines. Large systems have a maximum word length of 32 bits and a standard configuration price of \$350,000 and higher.
- MEAN TIME BETWEEN FAILURES (MTBF) - The elapsed time between hardware failures on a device or a system.
- MEAN TIME TO REPAIR - The elapsed time from the arrival of the field engineer on the user's site until the device is repaired and returned to the user for his utilization.
- MEAN TIME TO RESPOND - The elapsed time between the user placement of a service call and the arrival at the user's location of a field engineer.
- MINICOMPUTER - See Small System.
- OPERATING SYSTEM SOFTWARE (SYSTEMS SOFTWARE) - Software that enables the computer system to perform basic functions. Systems software,

for the purposes of this report, does not include utilities or program development tools.

- PERIPHERALS - Includes all input, output, and storage devices, other than main memory, which are locally connected to the main processor and are not generally included in other categories, such as terminals.
- PLANNING - Includes the development of procedures, distribution, organization, and configuration of support services. For example, capacity planning, "installation" planning.
- PLUG-COMPATIBLE MAINFRAME (PCM) - Mainframe computers that are compatible with and can execute programs on an equivalent IBM mainframe. The two major PCM vendors at this time are Amdahl and National Advanced Systems.
- SMALL BUSINESS COMPUTER - For the purpose of this study, a system which is built around a Central Processing Unit (CPU), has the ability to utilize at least 20M bytes of disk capacity, provides multiple CRT workstations, and offers business-oriented systems software support.
- SMALL SYSTEM - Refers to traditional minicomputer and superminicomputer systems ranging from a small multi-user, 16-bit system at the low end to a sophisticated 32-bit machine at the high end.
- SOFTWARE ENGINEER (SE) - The individual that responds (either on-site or via remote support) to a user's service call to repair or patch operating system and/or applications software.
- SOFTWARE PRODUCTS - Systems and applications packages, which are sold to computer users by equipment manufacturers, independent vendors, and others. Also included are fees for work performed by the vendor to implement a package at the user's site.

- SUPERMINICOMPUTER - See Small System.
- SYSTEM INTERRUPTION - Any system downtime requiring an Initial Program Load (IPL).
- SYSTEMS HOUSE - Integrates hardware and software into a total turnkey system to satisfy the data processing requirements of the end user. May also develop systems software products for license to end users.
- TRAINING - All audio, visual, and computer based documentation, materials, and live instruction designed to educate users and support personnel in the ongoing operation or repair of hardware and software.
- TURNKEY SYSTEM - Composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.



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